

## Racial Disparity in Columbia, MO Police Department Traffic Stops, 2017-2019

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### Executive Summary

In response to departmental and resident concerns we undertook a study to examine racial disparity in Columbia, MO Police Department (CPD) traffic stops using data from 2017-2019. We examined racial disparity in the city overall and at the beat level, differences across age and sex, the reasons for initiating post-stop searches, post-search outcomes, and factors that predict a stopped driver will be Black. Disparity rates are indicated throughout the summary. A rate of 1 indicates no disparity, whereas a rate greater than 1 indicates a disparity exists. We discuss the implications of our findings and make suggestions for CPD going forward.

Using traditional disparity measures, we find disparity in traffic stops conducted by the CPD that disfavors Black drivers and persists over time and place.

While disparity across beats is consistent, there is variation in its severity. Beats with the highest *disparity* in traffic stops include 70 (3.1% of residents; 27.6% of stopped drivers are Black) and 70D (5.4% of residents vs. 27.7% of stopped drivers are Black). Beats with the highest *counts* of stops of Black drivers are 20 and 40 which are 27.1 and 22.7 percent Black population respectively (highest in city).

Disparity rates are highest for Black males, followed by Black females, White males, and White females. Within each group younger drivers have higher disparity rates than older drivers. White females are the only group whose disparity rates fall below 1 (meaning their percent of stops is lower than their percent in the population).

Stops of White drivers are less likely to result in arrest, consent searches, and non-consent searches than stops of Black drivers. Likelihood of citation and warning are similar across groups. When a search is initiated, Black drivers are about twice as likely as White drivers to have had that search justified by drug or alcohol odor. The frequency of finding contraband during searches is similar across groups.

Regression results suggest that nighttime, officer tenure, driver age, male sex, age of vehicle, percent Black in the beat, and 911 calls for service scaled to stops significantly predict the likelihood that a stopped driver is Black, while season, day of week, number of passengers, and counts of 911 calls for service do not.

## Introduction

In this report, we examine racial disparity in CPD traffic stops across different levels of geography, age and sex, the reasons for initiating post-stop searches, post-search outcomes, and factors that predict the likelihood that a stopped driver is Black. Disparity, discrimination, and racial bias in policing have been historically, and continue to be, an important policy issue, as demonstrated through national protests, media events, and ongoing criminal justice legislation (Blessett, 2017; Moore, 2018). Addressing these issues is important with regard to improving police operations, legitimacy, and effectiveness, as well as quality of life and racial equity in justice for individuals and communities.

This work was completed at the request of CPD Chief Geoff Jones through the Office of MU Chancellor Dr. Mun Choi. The committee was asked to conduct an analysis that could aid in future training of officers in order to decrease racial disparity in stops. The particulars of the analysis were left up to the committee. A quantitative data analysis cannot in and of itself directly contribute to training protocols but can provide information to inform broader decision-making in the organization, including that related to data tracking that has implications for training. The role of this committee is limited to research, but notably, Chief Jones formed a citizen-based Vehicle Stop Committee (VSC) in April 2019. That committee is charged with using community outreach to address racial disparity in the department's vehicle stop rates, examining and improving police data collection processes, providing recommendations to the Chief for police training policies, and generating other suggestions.

Our report proceeds as follows. First, we briefly discuss research on racial disparities and racial bias in policing, including work completed on the CPD. Second, we describe our methodology. Third, we discuss the results of the analyses in turn. Lastly, we provide some recommendations for the CPD going forward. Please note that we use the terms Black, African American, and White throughout this report.

## Background and Literature Review

Police-resident interactions are important for law enforcement agencies and residents because they are related to residents' attitudes toward police (e.g. trust), perceptions of procedural justice, willingness to obey laws, and cooperation with police more generally (see for example: Carr et al., 2007; Epp et al., 2014; 2017; Hamilton & Foote, 2018; Sunshine & Tyler 2003; Tyler 2005). Black residents' negative interactions with police are often viewed as being motivated by racism on the part of law enforcement. Importantly, these interactions are experienced both personally and vicariously and cause harm to individuals and communities.

Qualitative experiences of African Americans' experiences with police, particularly those of young Black men, are demonstrated to be so consistently detrimental that Professor Rod Brunson, researching young Black men in St. Louis, summarized their experiences with the title "Police Don't Like Black People" (Brunson, 2007). Similarly, the experience of disparate policing in another Missouri context was captured by Epp and colleagues (2017), who surveyed and interviewed African Americans who were stopped by police in the Kansas City Metropolitan Statistical Area (MSA). They found that racially disparate traffic stops have negative outcomes for stopped African Americans, who often feel harassed and enter future police interactions with negative expectations.

A considerable amount of scholarly work has been completed on racial disparity in police stops in various locations in the United States. In general, this work concludes African Americans are stopped at rates that are higher than their proportion of the population and that Whites are

stopped at lower rates than their proportion in the population. There are several criticisms of the use of disparity rates to gauge police bias and/or discrimination against African Americans or other groups. The primary argument is that disparities result from disparate contact with law enforcement. One version of this critique works under the assumptions that 1) there is a strong correlation between stops and criminality and 2) African Americans commit more crime and thus the stop rates are proportionate to criminal offending. Another interpretation works under the understanding that African Americans have faced longstanding structural discrimination in housing and resource allocation and as such are more likely to live in disadvantaged neighborhoods with higher crimes rates. Here the argument is that police presence may be stronger and thus these residents are simply more likely to have contact with law enforcement. Another separate argument is that disparity rates cannot account for the population that drives in a particular place. We agree with this limitation but argue localized disparity rates matter as descriptors. Scholars have undergone some efforts at reducing this bias in data by using red light cameras and other methods but that is beyond the scope of this work.

Scholars at the University of Missouri who have previously conducted analyses of racial disparity in CPD stops worked to distinguish between racial disparity in stops and racial bias with regard to CPD officers (Eagan & Parsons, 2020; Milyo, 2018). These reports are collectively based on the yearly report from the State of Missouri Attorney General, the Missouri Vehicle Stop Report (Missouri Attorney General's Office, 2019), CPD stop data, and work that uses the Veil of Darkness methodology. Milyo (2018, p. 6) criticized statistical processes used to generate the Attorney General's disparity index, arguing that "simple descriptive measures of racial disparities like the 'disparity index' may be high or low regardless of the presence and extent of racial bias on the part of police." Meaning, Dr. Milyo argues, consistent with criticisms described above, that the disparity index marks differences between groups based on their population size and interactions with the police, but that does not necessarily imply that police racial bias is the source of racial disparity in stops/interactions. Using the Veil of Darkness method, which works under the assumption that drivers' race can be observed in daylight but not at night, he did not find evidence of discrimination by CPD officers. Eagan and Parsons (2020) similarly argue that disparity rates have limited utility and do not measure officer discrimination given differential exposure to law enforcement and driving patterns, and that much of the racial disparity in CPD stops can be attributed to the extent to which officers respond to 911 calls in neighborhoods with a higher percentage of Black residents.

We acknowledge that standard disparity rates have limitations but also argue that they provide valuable baseline information that is important for understanding citizen and community experiences of policing. The residents of the city have deep concerns about disparity rates and how they can be reduced. A fuller understanding of the nature of the reasons for poor relationships between CPD and the African American community will require additional statistical analyses as well as data collection such as a resident survey and qualitative interviews with both officers and residents. Such information could be a training aid. We extend previous disparity analyses by examining beat level disparity rates and rates across age and sex. This information will help CPD isolate the areas that drive disparity in stops.

### ***Research Questions***

In this research we address four questions:

- 1) What is the disparity index for 2017-2019 for Columbia, MO and each beat for Black and White drivers?
- 2) How do citywide disparity rates vary across race, age, and sex?
- 3) How do citywide stop outcomes vary across race?

- 4) What factors predict the likelihood that the stopped driver is African American?

## **Data and Methods**

### ***Data***

We use data from three sources: 1) incident-level public data on traffic stops obtained from the CPD website, 2) non-public data obtained directly from CPD—both of the above are from 2017, 2018, and 2019—and, 3) American Community Survey (ACS) 2015-2019 5-Year Estimates.<sup>1</sup> We focus on disparity in traffic stops between Black and White drivers in our analysis.

CPD makes their incident-level data on contextual characteristics of traffic stops available to the public on their website. Some of the available variables include type of stop, date, time, and day of the week. Driver characteristics include age, gender, race, city resident status, whether a search was conducted and whether it was done with consent, the reason for the search, whether contraband was found and if so the type, and whether the driver was arrested or had a warrant, and if so the basis for it. Non-public data was obtained from CPD and matched to individual stop incidents. Variables include stop location, deidentified officer identifiers, officer's tenure, information on the warrant status of stopped drivers (regardless of whether the stop was initiated because of a warrant), number of passengers in the vehicle, GPS coordinates of the exact stop location, and 911 calls for service in a beat per year.

Local sociodemographic variables were taken from the ACS. We operationalized neighborhoods as census tracts and mapped them onto the locations where stops occurred. We also considered the city and county (Boone) as a whole. For each geographic unit we gathered data on percent of non-Hispanic Black residents and percent of the population in poverty, as well as percent non-Hispanic White, mean household income, and percent homeowners. The latter variables are included in descriptive statistics for context.

Police beats are more relevant for this analysis than census tracts as they are the spaces that officers patrol every shift and thus “see,” and to which they are organizationally attached. Beats may be portions of one or more tracts, and because of this, tract information is not directly transferable to beats. In an extension to previous work done on CPD stops, we mapped ACS sociodemographic variables from census tracts onto police beats using the following procedure. We first assigned each traffic stop a beat by joining the Columbia police beats shapefile with the traffic stop data that includes the longitude and latitude coordinates of the stop. Similarly, we assigned a census tract to each traffic stop using the TIGER/Line Shapefiles 2018 (TIGER/Line, 2018) using the same process. We then employed population-weighted small area estimate methodology to calculate the values for each indicator based on block-level Census 2010 population distribution. We include beats 10, 20, 30, 40, 50, 60, 70, 70D, and 80, which comprise about 95% of all stops.

Population-weighted small area estimate methodology works like this with regard to an example variable (percent in poverty): consider a beat that overlaps two census tracts with half of the beat area in each tract. One tract has 75% percent of the population in poverty, the second has 25%, indicating that the police beat might have 50% of the population in poverty. However, by examining the block-level population distribution, we see that 80% of the beat's population actually resides in the tract with only a 25% poverty rate. Based on this we can say that 80% of

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<sup>1</sup> Population-weighted mapping procedures used 2014-2018 estimates.

the population has only a 25% poverty rate while 20% has the 75% rate, arriving at a weighted 35% poverty rate for the police beat  $((25 * 0.8) + (75 * 0.2))$ .

### ***Analytic Strategy***

We undertook our analyses in three parts. First, we conducted a traditional disparity analysis using the population composition of the City of Columbia, Boone County, and each CPD beat based on population-weighted small area estimates. Although highly imperfect, we included Boone County as a separate base for the disparity analysis as a point of comparison under the supposition that drivers in the City of Columbia are comprised, to some extent, of the larger county and regional population as well. Commuting populations can be estimated in more precise ways but that is beyond the scope of this work. We view beats as important places to examine while acknowledging that drivers in beats reflect a broader population than the residents themselves. We also calculated age-sex specific disparity rates. Disparity scores are derived from dividing the percentage of drivers of a particular race in a police department's traffic stop records by the percent of that population in the geography that is being policed. Thus, the disparity index provides a measure that can be interpreted as the rate at which group members are stopped relative to their proportion in the population. More generally, a disparity index that is greater than one indicates that the group is stopped at a higher rate than their representation in the population and a disparity index of less than one indicates members of the group are stopped at a rate that is less than their representation in the population.

Second, we conduct two types of hit rate analyses. First, we conduct a post-stop efficiency analysis that compares the outcomes of traffic stops between racial groups and results in what is termed an efficiency score, defined as the number of stops conducted on average before a given outcome occurs (Gelman et al., 2007). For example, one in ten drivers of one racial group that are stopped might be arrested while only one in twenty of another group might be arrested after being stopped. Those groups would have arrest efficiency scores of 10 and 20 respectively.

Following the first efficiency analysis, we conduct an additional analysis of the reasons that cars are searched in a similar style to the first efficiency analysis. In this second analysis, we examine post-search contraband scores. These can be interpreted as "among vehicles that were searched, 1 in X searches found contraband or were conducted for the given reason." Like other analyses, we examine contraband hits and search justifications between racial groups.

Finally, we conducted a regression analysis that examines factors that predict the likelihood of the stopped driver being Black. Variables examined are described in Table 1 below. The outcome is a dichotomous variable that equals 1 if the stopped driver was Black and 0 if not. Variables in part A are included in the regression. Variables in part B were initially included but dropped for parsimony due to their lack of significance. Similar to the beat-level disparity analysis, stops that occurred in beat 10, 20, 30, 40, 50, 60, 70, 70D, and 80 were included. Missing data existed, primarily due to lack of GeoID. The final sample size for the regression analysis was 40,468. Standard errors were clustered by beat.

Table 1. Variable Descriptions and Coding for Regression Analysis

| Variable Name   | Description  | Coding   |
|---|--|--|
| <b>Part A</b>   |  |  |
| Night Stop  | Binary variable indicating if the stop was at night.   | 0/1<br>Night = 1 (per CPD coding)  |
| Officer Tenure  | The number of years and months the officer had been at CPD when the stop occurred.   | Year of hire plus 12-month fractional year. Example: 2010.75 indicates the officer was hired in October 2010. Higher values indicate less seniority. |
| Newer Car   | Vehicle was manufactured in 2011 or later.   | 0/1<br>Older or vintage = reference  |
| Age of Driver   | Binary variables for the age category of the driver, with categories 18-29, 30-39, over 40, and other drivers.   | 0/1<br>18-29 = reference   |
| Sex   | Binary variable for male or female.  | 0/1<br>Female or unknown (*n=18) = reference   |
| Percent Black   | The percent (%) of African American or Black residents in the police beat.   | % 0-100  |
| # 911 calls for service per stop                                  | # 911 calls for service in beat/total stops in beat  | Interval variable. The total population of beats was not estimated. This is an effort to scale the count of calls.                                   |
| # 911 Calls for Service   | The number of 911 complaints for the three-year period, by beat.   | Interval variable  |
| <b>Part B</b> (dropped for parsimony due to lack of significance) |  |  |
| Day of Week   | Binary variables for the day of the week the stop occurred for each day of week.   | 0/1<br>Monday = reference  |
| Seasonality   | Binary variables for each season. Winter = January, February, March; Spring = April, May, June; Summer = July, August, September; Autumn= October, November, December. | 0/1<br>Summer = reference  |
| Passengers  | Binary variables for driver only, a driver and 1-3 passengers, or a driver with more than three passengers.  | 0/1<br>Driver only=reference   |

## Results

### Disparity Analysis

This section presents racial disparity indices for CPD traffic stops. As was described above, the disparity index compares the racial distribution of a department's contacts, in this case drivers pulled over in traffic stops, to the racial distribution of the population of the city and police beats. To illustrate, if we were examining a geographic unit consisting of 10% African Americans with traffic stops consisting of 10% African Americans, the disparity index would be 1 for African Americans in that area. If 20% of traffic stops were of African Americans, the disparity index would be 2 for African Americans in that area (twice as many African Americans stopped as exist in the population).

Table 2 shows descriptive statistics for demographic, economic, and policing variables for Columbia and its police beats. We also include information on Boone County, and disparity indices (using the city stop numbers) based on the Boone County population with the understanding that drivers in the city may be comprised of a broader population, for further contextualization.

In Columbia, 10.9% percent of the population identify as single-race, non-Hispanic African American or Black and 74.5% identify as single-race, non-Hispanic White. We treated the three years of data as a cross-section. There were a total of 12,437 traffic stops in 2017, 16,707 in 2018, and 15,015 in 2019 (total = 44,159). Of these stops totaled, 14,178 were of African American drivers and 27,286 were of White drivers. Generally, these data suggest that African Americans are stopped at a rate of 2.9 times their proportion in the city while Whites are stopped less than their contribution to the population (0.8). If we use the county population as the basis for the disparity index for African American drivers, it is 3.6.

We find variable disparity indices for African Americans across beats, with values between 1.6 and 8.9. Note that with regard to beats, values are approximate because we used population-weighted averaging and because some beats were not included in the analysis. No beat achieves traffic stop parity with its underlying residential population. However, some beats, such as 20 and 40, fall below the CPD average. On the other hand, several beats, particularly beats 70 and 70D, show substantial disparity, with beat 70 traffic stops including African American drivers at a rate of almost nine times their contribution to the beat residential population. Generally, as might be expected, beats with lower disparity have higher proportions of the population who are African American and beats with higher disparity have fewer African American residents. Although this may be an obvious statement, it suggests that Black drivers stopped in 1) White residential spaces and 2) the downtown and east campus areas contribute to disparity indices. Importantly, these beats have the lowest overall number of stops. The highest counts of total stops of Black drivers can be found in beats 20, 30, and 40, which are also the beats with the highest proportion of the population that is African American. Thus, CPD could approach reducing jurisdiction-wide disparity rates in multiple ways.

Table 2. Descriptive Statistics and Disparity Rates for Columbia, MO and Traffic Stops for City of Columbia, Boone County, and by Police Beats, 2017 - 2019

|  | City    | Boone County | Beat 10 | Beat 20 | Beat 30 | Beat 40 | Beat 50 | Beat 60 | Beat 70 | Beat 70D | Beat 80 |
|--|---------|--------------|---------|---------|---------|---------|---------|---------|---------|----------|---------|
| % Non-Hispanic African American or Black | 10.9    | 9.0          | 10.9    | 27.1    | 19.5    | 22.7    | 5.4     | 7.5     | 3.1     | 5.4      | 8.1     |
| % Non-Hispanic White                     | 74.5    | 78.9         | 71.6    | 58.8    | 69.2    | 66.1    | 80.2    | 77.5    | 81.0    | 99.0     | 73.2    |
| % in Poverty                             | 21.8    | 17.9         | 10.8    | 36.5    | 13.9    | 27.5    | 10.3    | 19.8    | 57.0    | 63.2     | 34.4    |
| % Owner Occupied                         | 47.4    | 55.6         | 67.1    | 30.1    | 57.6    | 39.2    | 64.3    | 45.4    | 13.5    | 6.1      | 32.7    |
| Mean Household Income (\$)               | 74,727  | 75,435       | 69,452  | 46,863  | 64,588  | 49,588  | 89,090  | 84,650  | 33,352  | 32,489   | 59,421  |
| # 911 Calls for Service                  | 351,648 | -            | 36,815  | 38,427  | 38,653  | 42,221  | 40,257  | 41,056  | 18,330  | 55,238   | 40,651  |
| Total Stops                              | 44,159  | -            | 3,587   | 6,764   | 5,044   | 6,199   | 5,034   | 4,726   | 2,866   | 1,851    | 5,204   |
| # Stops Black Drivers                    | 14,178  | -            | 1,302   | 2,999   | 1,941   | 2,684   | 941     | 975     | 790     | 513      | 1,440   |
| % Stops Black Drivers                    | 32.1    | -            | 36.3    | 44.3    | 38.5    | 43.3    | 18.7    | 20.6    | 27.6    | 27.7     | 27.7    |
| Disparity Rate, Black Drivers            | 2.9     | 3.6          | 3.3     | 1.6     | 2.0     | 1.9     | 3.5     | 2.7     | 8.9     | 5.1      | 3.4     |
| # Stops White Drivers                    | 27,286  | -            | 2,089   | 3,468   | 2,824   | 3,237   | 3,271   | 3,370   | 1,901   | 1,194    | 3,423   |
| % Stops White Drivers                    | 61.8    | -            | 58.2    | 51.3    | 56.0    | 52.2    | 73.9    | 71.3    | 66.3    | 64.5     | 65.8    |
| Disparity Rate, White Drivers            | 0.8     | 0.8          | 0.8     | 0.9     | 0.8     | 0.8     | 0.9     | 0.9     | 0.8     | 0.7      | 0.9     |

Notes: There were a total of 44,159 stops from 2017-2019. Because we employed a population-weighted small area estimate methodology for beats, values for beat demographics are approximate. Racial composition values are for the percent of the population that identified as single-race, non-Hispanic African American or Black, and White. Values are from ACS 5-Year Estimates 2015-2019 for the city and county and 2014-2018 for beats. Calls for service (911) are summed across the three years. Disparity rates for the county include only stops in the city and are for informational purposes based on the idea that county residents comprise some proportion of drivers in the city.



CPD and the public may benefit from understanding citywide disparity rates across race, age, and sex. Table 3 below displays this information. Age ranges are chosen to align with the overlap between CPD data coding of age and ACS data. We do not include information for stops of drivers under the age of 18 and collapse the 30-39 and 40 and over categories. We refer to younger drivers as those ages 18-29 and older drivers as those 30 or older. Note that the data here are taken from Tables B01001A and B0100B of the 2015-2019 ACS 5-Year Estimates which do not separate out Hispanic ethnicity. Younger African American males have the highest age-sex specific disparity rate at 6.8, while White females over 30 have the lowest rate at 0.8. Groups' disparity rates fall within this range in this descending order: younger Black males, older Black males, younger Black females, older Black females, younger White males, older White males, Younger White females, older White females.

Table 3. Disparity Rates for African American and White Drivers across Age and Sex, Columbia, MO, 2017 - 2019<sup>1</sup>

|   | Population Count | Percent of Population | Stop Count | Percent of Total Stops | Disparity Rate |
|---|------------------|-----------------------|------------|------------------------|----------------|
| Columbia City Total                       | 121,230          | 100.0                 | 44,159     | 100.0                  | 1              |
| African American Females aged 18-29       | 2,302            | 1.9                   | 2,969      | 6.7                    | 3.5            |
| African American Females aged 30 and over | 3,101            | 2.6                   | 2,470      | 5.6                    | 2.2            |
|   |                  |                       |            |                        |                |
| African American Males aged 18-29         | 1,683            | 1.4                   | 4,150      | 9.4                    | 6.8            |
| African American Males aged 30 and over   | 2,872            | 2.4                   | 4,266      | 9.7                    | 4.1            |
|   |                  |                       |            |                        |                |
| White Females aged 18-29                  | 17,417           | 14.4                  | 5,314      | 12.0                   | 0.8            |
| White Females aged 30 and over            | 24,456           | 20.2                  | 6,187      | 14.0                   | 0.7            |
|   |                  |                       |            |                        |                |
| White Males aged 18-29                    | 15,169           | 12.5                  | 7,178      | 16.3                   | 1.3            |
| White Males aged 30 and over              | 21,949           | 18.1                  | 7,910      | 17.9                   | 1.0            |

<sup>1</sup> There were a total of 44,159 stops from 2017-2019. Population count estimates for the City of Columbia are taken from the 2015-2019 American Community Survey 5-Year Estimates (Tables B01001A and B0100B). Note that Hispanic ethnicity is not separated from race variables.

### **Efficiency Rate Comparison**

We now examine the efficiency of traffic stops in CPD as a whole across racial groups to determine if there are differences in post-stop outcomes. We use an efficiency score that represents how many stops occur for each group on average before a particular outcome occurs. For example, if one out of every ten traffic stops of White drivers resulted in a citation, we would say that the White citation efficiency score is 10. In other words, lower efficiency scores indicate fewer stops happen before the outcome occurs. As an extreme example, an efficiency score of 1 for arrests for stopped drivers of a given race would indicate that every stopped driver of that race was arrested. Within each year, we look at the post-stop outcome efficiency scores for Whites and African Americans. Incident to arrest refers to searches conducted during an arrest.

Results in Table 4 show that about one in seven to eight stops of African American drivers leads to an arrest, whereas between about one in nine to fourteen stops of White drivers leads to an arrest. We note that a consistent criticism found in the literature is that the choice to arrest can be impacted by bias (Ridgeway, 2007). There is very little to no disparity in efficiency scores between African Americans and Whites in terms of citations, with both groups having about one citation per seven to eight stops. Post-stop consent searches are more common among Black drivers and vary considerably across years. Non-consent (other searches) are more commonly conducted among stopped African American drivers. The total search efficiency score reflects the combination of consent and non-consent searches. Warning efficiency is about equal between races, with many traffic stops ending in a warning for both African American and White drivers.

Among those searched, searches were about equally efficient for finding contraband across race. For both White and African American drivers, when a search was initiated, contraband was usually found a little less than half the time. With regard to the reasons for searches, one in every 2.1 to 2.5 searches of African American drivers was conducted because of drug or alcohol odor while 1 in between 4.4 and 6.3 searches of White drivers was conducted based on odors, making this a more common search motivation among African American drivers. Searches of White drivers due to contraband being in plain view were initiated between 1 in 7.7 and 1 in 12.0 of searches. Overall, this is similar to the rate that African Americans are stopped for having contraband in plain view. Stops led to searches because the driver was being arrested at a somewhat higher rate for White drivers than African American drivers across the three years.

Table 4. Efficiency Scores: Average Number of Stops Conducted per Outcome across Race and Year (N=44,159)

| Year  | Arrest Score   |              | Citation Score |              | Consent Search Score |              | Non-Consent Search Score |              | Total Search Score |              | Warning Efficiency Score |              |
|-------|----------------|--------------|----------------|--------------|----------------------|--------------|--------------------------|--------------|--------------------|--------------|--------------------------|--------------|
|       | <i>Afr. Am</i> | <i>White</i> | <i>Afr. Am</i> | <i>White</i> | <i>Afr. Am</i>       | <i>White</i> | <i>Afr. Am</i>           | <i>White</i> | <i>Afr. Am</i>     | <i>White</i> | <i>Afr. Am</i>           | <i>White</i> |
| 2017  | 8.1            | 12.7         | 8.7            | 8.4          | 30.1                 | 35.5         | 8.7                      | 20.7         | 6.7                | 13.1         | 1.2                      | 1.2          |
| 2018  | 8.3            | 13.9         | 6.5            | 7.0          | 26.7                 | 40.8         | 9.8                      | 25.8         | 7.2                | 15.8         | 1.3                      | 1.2          |
| 2019  | 7.1            | 9.5          | 9.3            | 8.9          | 14.7                 | 16.9         | 7.5                      | 17.0         | 5.0                | 8.5          | 1.3                      | 1.2          |
| Total | 7.8            | 12.0         | 7.9            | 8.1          | 21.1                 | 27.5         | 8.5                      | 21.2         | 6.1                | 12.0         | 1.3                      | 1.3          |

Table 5. Search Efficiency Scores: Contraband Found and Justification (N=44,159)

| Year  | Search Found Contraband |              | Reason: Drug/Alcohol Odor |              | Reason: Contraband in Plain View |              | Reason: Incident to Arrest |              |
|-------|-------------------------|--------------|---------------------------|--------------|----------------------------------|--------------|----------------------------|--------------|
|       | <i>African American</i> | <i>White</i> | <i>African American</i>   | <i>White</i> | <i>African American</i>          | <i>White</i> | <i>African American</i>    | <i>White</i> |
| 2017  | 2.2                     | 2.3          | 2.4                       | 5.7          | 9.9                              | 7.7          | 5.2                        | 5.3          |
| 2018  | 1.8                     | 2.0          | 2.1                       | 4.4          | 8.5                              | 8.9          | 6.1                        | 4.2          |
| 2019  | 2.0                     | 2.2          | 2.5                       | 6.3          | 12.4                             | 12.0         | 5.1                        | 4.6          |
| Total | 2.2                     | 2.2          | 2.3                       | 5.5          | 10.3                             | 9.7          | 5.4                        | 4.3          |

## Regression Analysis

Table 6 below displays odds ratios from a logistic regression analysis of the likelihood that a stopped driver is Black on stop, individual, and beat characteristics. The odds that the stopped driver is Black are almost 50 percent higher at night. Younger/newer officers are more likely to pull over Black motorists (recall higher values equal lower seniority). Stops of newer cars are less likely to be of a Black driver than older cars. Drivers over the age of 40 that are stopped are less likely to be Black than those aged 18-29 and if the stopped driver is male they are more likely to be African American. Black drivers are more likely to be pulled over as the percent of African American population in the beat increases. Finally, we include 911 calls for service in two ways. First, we scale it to the number of stops in the beat, and second, we include it as a count (variance inflation factors did not exceed 2). We found that the scaled variable is positively associated with the likelihood that the stopped driver is Black while the count variable is negatively associated with that likelihood. Meaning, beats where there are fewer stops per 911 call have a higher likelihood of stopped drivers being Black while the total number of calls decreases that same likelihood.

Table 6: Odds Ratios from Logistic Regression of Likelihood of Stopping a Black Motorist on Independent Variables, 2017-2019<sup>1</sup>

|                         | Odds Ratio | Std. Err. |
|-------------------------|------------|-----------|
| Night Stop***           | 1.48       | .12       |
| Officer Tenure***       | 1.01       | .00       |
| Newer Car**             | .86        | .05       |
| Age <18                 | .81        | .14       |
| Age 30 to 39            | 1.01       | .04       |
| Age over 40***          | .72        | .05       |
| Male**                  | 1.08       | .03       |
| % Non-Hispanic Black*** | 1.05       | .01       |
| Calls per Stop*         | 1.07       | .03       |
| Calls for Service /1000 | .96        | .02       |

<sup>1</sup> \* p< .05, \*\* p<.01, \*\*\* p<.001, two-tailed. Standard errors are clustered by beat; N=40,468. We include beats 10, 20, 30, 40, 50, 60, 70, 70D, and 80.

## Recommendations

Our findings suggest high African American disparity and corresponding low White disparity in CPD traffic stops for the years 2017, 2018, and 2019. To reduce African American disparity by beat requires a level of prioritization that considers both the number of stops that occurred in police beats and the disparity within that beat. For example, beats 70 and 70D have high African American disparity indices (9.01 and 5.23 respectively) but contain a relatively low percentage of total stops (6.5% and 4.3% respectively). On the other hand, beats 20 and 40, while still disparate, have relatively low African American disparity indices (as compared to elsewhere in the city) (1.63 and 1.91) while containing a higher number of total stops (15.4% and 14.1%). Interventions into disparity by beat will need to consider where most stops occur and where stops are especially disparate.

We understand that, while providing a snapshot of racial inequities in police-resident encounters, simple disparity rates are problematic for several reasons from the perspective of both residents and officers. Qualitative factors about the nature of interactions also matter. Thus, improving police-resident relations requires a more holistic approach than simply monitoring disparity rates. For these reasons we make recommendations below that include monitoring of disparity rates but also include suggestions to address police-resident relations through utilization of additional quantitative and qualitative data at regular intervals. Certain components are noted for their possible direct contributions to training, but the information gained from all recommendations would be potentially relevant.

We recommend that the CPD:

- 1) Adopt an agreed upon set of data analyses to be conducted annually and/or quarterly as appropriate to monitor racial disparities in traffic stops at the city and beat levels. In addition to overall racial disparities, we suggest that rates be calculated within race by age and sex for informational purposes.
- 2) Assess individual Columbia officers' propensity to stop Black drivers relative to similarly situated Columbia officers (e.g. with regard to shift, beat demographics, 911 calls for service, season, day of week, vehicle characteristics, etc.) using propensity score weighting. The propensity score weighting process allows comparison of one officer to a group of all other officers in the analysis while holding variables constant that might influence the race of the stopped driver. We suggest CPD conduct this internal benchmarking analysis annually in order to flag officers that have a much higher likelihood (e.g. 2.5-3 standard deviations above the mean) of pulling over Black drivers than their peers. Identified officers should be interviewed regarding the circumstances of their stop log and flagged for additional training. This internal investigation is warranted given the way these officers may contribute to racial disparity in the city and in individual neighborhoods/beats.
- 3) Although our (less detailed) summary results suggest that counts of beat level 911 calls for service do not predict the likelihood of pulling over Black drivers, this could be further evaluated with greater detail on victim/complainant and suspect race and sex with age/race/sex specific disparity rates and/or over shorter periods of time.
- 4) Further evaluate the distribution of the ways that searches are justified and consider their implications. For example, further investigate the use of drug and alcohol odor as a justification to initiate searches, given that African American drivers are twice as likely to have their search justified for that reason than White drivers. An investigation into consent searches may provide another avenue to understand racial disparity in CPD-resident encounters given disparity between African American (who are searched fairly often) and White (who are searched less often) drivers.
- 5) Consider the ways that the unique dynamics of a university town contribute to racial disparities in policing. For example, additional analyses could assess the extent to which sporting events and student-centered spaces factor into disparity rates.
- 6) Additional work should be undertaken to attempt to obtain qualitative information on racial equity and the experience of policing from officers' perspective. A sample of officers should be interviewed annually in order to obtain information about their challenges and successes, as well as their perceptions of these issues in the city as a whole, as they view them.
- 7) Efforts should be made to survey and/or interview community members with regard to experiences with and perceptions of CPD. The sample should be broadly representative

in order to capture diversity in experiences and perceptions, yet efforts should be made to ensure that an adequate sample of groups that are most heavily policed are included.

- 8) Information gained from interviews of officers and residents and data monitoring should be incorporated into training programs that focus on racial equity in policing. Use data to drive and inform intervention (both policy and programming) decisions.
- 9) We support the efforts of the Vehicle Stop Committee to make changes and additions to the data collected by CPD. CPD is at the forefront of data collection and transparency among departments nationally. These proactive efforts continue to support that position.

## References

- Blessett, Brandi. 2017. To imagine a world where all lives truly mattered. *Public Integrity*, 19(3), 191-195.
- Brunson, R. K. (2007). "Police don't like black people": African-American young men's accumulated police experiences. *Criminology & public policy*, 6(1), 71-101.
- Carr, Patrick J., Laura Napolitano, and Jessica Keating. 2007. "We Never Call the Cops and here is Why: A Qualitative Examination of Legal Cynicism in Three Philadelphia Neighborhoods." *Criminology* 45 (2): 445-480. doi:10.1111/j.1745-9125.2007.00084.x
- City of Columbia Police Department (2021). Data, Reporting, & Forms. <https://www.como.gov/police/data-reporting-forms/>.
- Eagan, Joshua and Eric Parsons. Traffic disparities in Columbia, Missouri (2018-2019). 2020. Personal files.
- Epp, Charles, Steven Maynard-Moody, & Donald Haider-Markel. 2014. *Pulled over: How police stops define race and citizenship*. Chicago, IL: University of Chicago Press.
- Epp, Charles, Steven Maynard-Moody, and Donald Haider-Markel. 2017. Beyond profiling: The institutional sources of racial disparities in policing. *Public Administration Review*, 77(2), 168-178.
- Gelman, Andrew, Jeffrey Fagan, and Alex Kiss. 2007. An analysis of the New York City Police department's "stop-and-frisk" policy in the context of claims of racial bias. *Journal of the American Statistical Association*, 102(409), 813-823.
- Hamilton, Aretina, and Kenneth Foote. 2018. Police torture in Chicago: Theorizing violence and social justice in a racialized city. *Annals of the American Association of Geographers*, 108(2), 399-410.
- Milyo, Jeff. 2018. DWB in COMO: Understanding race disparities in vehicle stops and searches. Last accessed 3 december 2020. Retrieved from <http://web.missouri.edu/~milyoj/files/Understanding%20Racial%20Disparities%20in%20Vehicle%20Stops%20and%20Searches%20in%20Columbia.pdf>.
- Missouri Attorney General's Officer. 2019. 2019 Vehicle stops report. Last accessed 4 December 2020. Retrieved from [https://ago.mo.gov/docs/default-source/public-safety/2019agencyreports.pdf?sfvrsn=588581e3\\_2](https://ago.mo.gov/docs/default-source/public-safety/2019agencyreports.pdf?sfvrsn=588581e3_2).
- Moore, Darnell. 2018. Black radical love: A practice. *Public Integrity*, 20(4), 325-328.
- Ridgeway, Greg. 2007. Analysis of racial disparities in the New York Police Department's stop, question, and frisk practices. *RAND infrastructure, safety, and environment*. Last accessed 3 December 2020. Retrieved from [https://www.rand.org/pubs/technical\\_reports/TR534.html](https://www.rand.org/pubs/technical_reports/TR534.html).
- Sunshine, Jason, and Tom R. Tyler. 2003. "The Role of Procedural Justice and Legitimacy in Shaping Public Support for Policing." *Law & Society Review* 37 (3): 513-548. doi:10.1111/1540-5893.3703002
- TIGER/Line. 2018. Shapefiles (machine readable data files). Prepared by the U.S. Census Bureau, 2018.
- Tyler, Tom. 1990. *Why people obey the law*. New Haven, CT: Yale University Press.
- Tyler, Tom R. 2005. "Policing in Black and White: Ethnic Group Differences in Trust and Confidence in the Police." *Police Quarterly* 8 (3): 322-342. doi:10.1177/1098611104271105
- U.S. Census Bureau. American Community Survey, 2015-2019 American Community Survey 5-Year Estimates, Table B01001A; data.census.gov.
- U.S. Census Bureau. American Community Survey, 2015-2019 American Community Survey 5-Year Estimates, Table B01001B; data.census.gov.
- U.S. Census Bureau. Demographic and Housing Estimates 2015-2019 American Community Survey 5-year Estimates. Retrieved from <https://data.census.gov/cedsci/table?q=&g=1600000US2915670&tid=ACSDP5Y2019.DP05>