Center for Violence Prevention and Community Safety
Arizona State University

Annual Report for the Maricopa County Sheriff's Office: Years 2016 to 2017

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About the Center for Violence Prevention & Community Safety

Arizona State University, in order to deepen its commitment to the communities of Arizona and to society as a whole, has set a new standard for research universities, as modeled by the New American University. Accordingly, ASU is measured not by whom we exclude, but by whom we include.

The University is pursuing research that considers the public good and is assuming a greater responsibility to our communities for economic, social, and cultural vitality. Social embeddedness – university-wide, interactive, and mutually-supportive partnerships with Arizona communities – is at the core of our development as a New American University.

Toward the goal of social embeddedness, in response to the growing need of our communities to improve the public's safety and well-being, in July 2005 ASU established the Center for Violence Prevention and Community Safety. The Center's mission is to generate, share, and apply quality research and knowledge to create "best practice" standards.

Specifically, the Center evaluates policies and programs; analyzes and evaluates patterns and causes of violence; develops strategies and programs; develops a clearinghouse of research reports and "best practice" models; educates, trains, and provides technical assistance; and facilitates the development and construction of databases.

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1. Executive Summary

In 2013, the Maricopa County Sheriff's Office (MCSO) came under a federal court order regarding racially biased policing practices. As part of meeting the requirements of the court order, the MCSO contracted with the Center for Violence Prevention and Community Safety (CVPCS) to receive technical and analytical assistance to both increase the data and analytical infrastructure surrounding the MCSO's traffic stop data analysis work group and enhance the MCSO's capacity to collect, maintain, analyze, and disseminate traffic stop data.

The goals of the annual report are to evaluate the quality of the traffic stop data the MCSO gathers from deputies making self-initiated stops as well as to understand the presence and extent of racially biased policing within the patrol function of the MCSO.

In regards to the traffic stop data, to date, the MCSO has made significant progress in increasing the quality of their data. Previous issues, such as missing data and duplicate stops, have either been eliminated or drastically reduced. We encourage the MCSO to continue to be responsive to the needs of improving its traffic stop data collection and management.

To examine the relationship between racially disparate policing and traffic stops within the patrol function of the MCSO, our team attempts to answer the following research questions with the available traffic stop data:

1. *Does descriptive, internal benchmarking identify any deputies who are engaging in policing behavior (i.e., arrest, search, seizures, and citations) towards race/ethnic minority drivers that is markedly different from their similarly situated peers?*

2. *In the fiscal year of 2016-2017, are there racial/ethnic differences in post-stop outcomes within the patrol function of the MCSO?*

3. *Are deputies' assigned to traffic enforcement details associated with differences in post-stop outcomes across driver race/ethnicity, and if they are, how do those affects work?*

4. *If there is evidence of racial or ethnic bias in the above analyses, is it due to systemic bias within the patrol section of the MCSO or are the differential effects across race/ethnicity due to a few deputies who show a pattern of problematic behavior?*

5. *Are deputies who have been identified as engaging in potentially problematic behavior in the previous reporting years of 2014-2015 and 2015-2016 responsible for the differential race/ethnicity effects for arrest, search, citation and length of stop in 2016-2017, provided those differences exist?*

6. *Have the differential race/ethnicity effects changed over time? More specifically, do the differential race/ethnicity effects found in years 2014-2015 and 2015-2016 continue into 2016-2017, and if they do, are the 2016-2017 race/ethnicity effects different in size and direction than years previous?*

We employ two types of internal benchmarking to examine the above questions. First, we use simple ratio analyses, which are meant to identify if deputies are engaging in potentially biased behavior. To construct the ratios, we compare deputies' rates of a specific post-stop outcome by race to the rates of other deputies conducting self-initiated stops in the same district, to determine if deputies are engaging in

behavior at a rate that is two or more times higher than their peers in the same district. When this occurs, deputies receive a "flag;" flags are indicators that a deputy *may* be engaging in racially biased policing and their behavior may warrant investigation. With the ratio method, we find a number of deputies whose rates are at least two times higher than what their peers are doing in the same district on the outcomes of citations, arrest, search, and seizure. While the ratios are a commonly used identifier of behavior that is outside of what is typical in a district, their calculation is sensitive to low numbers of stops. As such, when using ratios to determine if deputies policing behavior should be examined more closely, we suggest the MCSO consider the number of stops that go into constructing the ratio. Moreover, the ratio analyses do not take into consideration other aspects of a stop that may account for disparate behavior by deputies across drivers' race/ethnicity.

Next, we use statistical modeling to determine if there is systemic bias within the patrol function of the MCSO, as well as identify deputies who may be engaging in potentially biased activity net of a number of driver, deputy, and traffic stop characteristics that are associated with post-stop outcomes. We find consistent evidence that minorities, such as Hispanics, are treated differently from Whites for a number of post-stop outcomes. When modeling the likelihood of stop outcomes controlling for deputies who have been flagged in previous years, we find these deputies do not account for racial differences across outcomes. Special assignments and grant work do not have an impact on minority differences in post-stop outcomes. The issue of differential outcomes for minorities appears to be an issue that is spread across the patrol function of the MCSO rather than a function of the behavior of a small number of deputies.

Last, we find little change in the differential race effects for post-stop outcomes over time with the exceptions of length of stop. The length of stop for Hispanics has steadily declined between 2014 and 2017. Hispanics continue to have a greater likelihood of the post-stop outcomes of arrest and search, as was reported in the 2015-2016. Compared to previous years, is a decline in the likelihood of a stop resulting in a citation, however, the decrease is universal across race and gender groups, rendering Hispanics' citation rate non-significant.

Given the findings, we recommend that the MCSO investigate internal policies and organizational culture that may be generating racial disparities in the field. There may be organizational policies and decision making that, on their face, appear race/ethnicity neutral, though when in put into practice, result in disparate treatment of minorities. Moreover, there may be aspects of informal culture within the patrol function of the MCSO that also contribute to differential outcomes by race/ethnicity. We encourage the MCSO to conduct an agency wide survey to examine cultural aspects of policing that might be influencing systematic bias in traffic enforcement. A formal examination of both internal organizational policies and culture – both formal and informal – would be beneficial to the MCSO in determining where the source(s) of the disparate treatment of minorities lie.

2. Data Audit

The purpose of the annual data audit is to assist the Maricopa County Sheriff's Office in assessing the quality of their data and data collection process, as well as to develop and maintain high data quality. Regular examination of data quality enables any future policy and training recommendations to be based on the best quality data that is possible. Without indicators of high data quality, results from analyses may be seen as questionable.

The data employed in the audit encapsulates one year of deputy-initiated traffic stops by the Maricopa County Sheriff's Office (MCSO) deputies ranging from July 1, 2016 to June 30, 2017. While the MCSO had other calls for service during this period, this data includes only deputy-initiated traffic stops, which is the proper unit of analysis for discerning any racial/ethnic bias or profiling involved in traffic stops.

There are two data sources employed in the data audit.[1] The first is computer-aided design (CAD) information – or data about the traffic stops coming from the dispatch center. Geographic coordinates for each stop are pulled from the CAD data and matched to the TraCS data (this is discussed next) through the Event Number identifier. The second data source is the TraCS data, which includes the data coming from the vehicle stop contact form that was established as a part of the federal court order. Deputies use a vehicle stop contact form to collect information about each traffic stop beyond what is collected in each citation, warning, or incidental contact report. Here, individual traffic stops are identified by the variable Prdkey, which links the various sources of information within this dataset via the software SQL. The TraCS data contains information on the incident, driver, passenger(s) if there are any, and location of the traffic stop. For ease of reporting, this report will refer to the above datasets collectively as the "TraCS" data for the remainder of the report.

2.1 General Issues with the Data

Most of the general issues with the data from previous years have been resolved. The primary challenge this year was the addition of over fifty new variables to the data. Moreover, the new variables were implemented at the beginning of 2017. Relatedly, several variables were removed from data collection during the course of the year given that they would replicate previous means of collecting information. For example, in January 2017, the search variables changed significantly. Rather than having a few indicators of search (yes/no), consent search (yes/no), and search incident to an arrest (yes/no), the new search variables specified what type of search was conducted. The consequence of this change, though, was that the previous search variables were no longer collected. We discuss areas of improvement below.

2.2 Areas of Improvement

There are several noted areas of improvement in data quality for this data year. One of these is geo-location of traffic stops. Although the MCSO has discontinued using dual systems to track stop location

[1] Note we do include other sources of data in the analyses. Exclude those sources of information from this audit because they are not collected using the TraCS software and vehicle stop contact form.

(i.e., one through CAD and the other in patrol cars), the single remaining system provided latitude and longitude coordinates for 100% of traffic stops.

Second, duplicate data was a much smaller problem this year than in previous years. In previous years, duplicates had to be addressed via random selection. More specifically, when duplicate data was identified, we would randomly select which of the duplicates would remain in the data. This enables us to keep at least some portion of the data that was duplicated. In previous years, there were over 100 duplicates in the data, with the 2014-2015 fiscal year being the most problematic. This year, however, there was only one stop that was duplicated. The duplicate stop was simply removed from the analysis. Thus, this issue has effectively been resolved.

Third, as will be discussed below, rates of missing data were dramatically reduced this year.

Finally, the MCSO created a more complete data dictionary this year, which enabled the better evaluation of which variables were active, when they were introduced/removed, and whether or not they were required for each traffic stop.

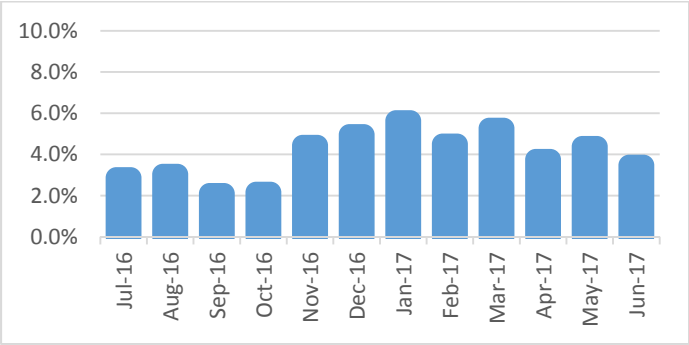
2.3 Missing Data

For data to be regarded as high quality, no more than 5% of the data should be missing (Engel et al. 2009; Engel, Cherkauskas and Smith 2008; Fridell 2004). To examine data quality for the MCSO, we examine two different types of missing data: 1) data that the deputies are required to enter for each stop, and 2) missing variables for all variables in the dataset.

First, we examine missing data related to the variables or fields that deputies are required to report for each stop. For purposes of the data audit, the 36 variables considered as required data do not include information supplied by TraCS software in the vehicle stop contact form. We do this in order to isolate data issues occurring primarily through human error. A stop is considered to have missing data if any of the required fields are left blank. If this is the case, that stop will be excluded from the analyses.

Figure 1 shows the percent of stops with missing data by month during the third year of data collection. For required variables, the range of missing data was as low as 2.1% of cases in September 2016, and as high as 5.6% in January of 2017. For the three months that are over 5% (December 2016, January 2017, and March 2017), though, the percent of missing data is very close to 5%. In comparison, from the last fiscal year (2015-2016), the highest amount of missing data by month was over 7%. While deputies have never been overly negligent in entering required data, over the past year, their already decent numbers have improved. Procedures that require supervisors to review and approve all stops for their deputies appear to be having the desired effect of increasing data quality and reducing missing information.

Figure 1. Percentage of Missing Data by Month for Variables Deputies are required to Enter



Next, when looking at all variables, we estimate the amount of information that is missing. There are over 300 variables included in this analysis of any missing data.[2] When examining the full set of variables, there were no months where the MCSO was beneath a 5% missing data threshold for the full set of variables. All stops had missing information in at least one variable. This is similar to the last data set for the fiscal year of 2015-2016 rate of missing data.

2.4 Invalid Data

There are a number of ways that data can become invalid, with the most common being a typo or a data entry error on the part of whoever is entering the data. Deputies, who enter the data for the traffic stops, can easily make these mistakes given that they are often entering data in less than ideal circumstances. For instance, deputies have to enter traffic stop data in their patrol cars quickly so they can get to the next call or on the side of a noisy road. These types of difficult and restrictive circumstances can easily cause data entry error. This is especially true for variables the deputies have to type in by hand, rather than variables whose values can be selected from a drop down menu. Common variables to have miss-keyed data, such as typos or nonsensical dates, include the address of the stop, the birth date of the driver, and the license plate information of the vehicle.

2.5 Suggestions for Increasing Data Quality

Over the past three years, the quality of data coming from the TraCS software and vehicle stop contact forms has increased dramatically. Policies requiring supervisors to review each stop for errors, including data entry errors, has reduced missing or invalid data. That said, there are several recommendations that would assist the MCSO in obtaining lower rates of missing and invalid data to facilitate increasing data quality.

[2] Note that in this analysis, we do not consider all missing data equally. If a variable is not relevant to the stop, the estimation of missing data does not include those variables. For example, if a stop shows that the driver has been given a citation, but the deputy did not perform an arrest, search, or seizure, the data contained within the variables will equal 0 or be blank. We do not consider this missing data. Another example would be the search incident to an arrest variable: if the stop does not include an arrest, the value on the search incident to an arrest variable would not be applicable.

First, deputies have performed better on the data entry of required variables this year than in years prior. Supervision of data entry by supervisors has facilitated this progress.

Invalid data or data entry errors could be due not to the deputy themselves but the difficulty in understanding field meanings in the vehicle stop contact form or the need for easy pull down menus. To help in this area, we recommend providing deputies with feedback and training on TraCS that is intensive and ongoing. In addition, we recommend a formal process of gathering deputy feedback and comments on the TraCS software, particularly the vehicle stop contact form that could be used to improve the systems.

We suggest that the MCSO continue to conduct internal data audits over the course of each year to identify variables with frequently missing data and address those data gaps as early as possible.

Additionally, we recommend that deputies take advantage of the comments box provided in TraCS. This comment box can serve to document unusual traffic stops in order to alert supervisors and others examining their data to potential issues as they arise. For example, some stops last longer than average for legitimate reasons. In the 2015-2016 report, we were able to identify several comments made by deputies which described the causes of extended stops. Through this process, the comment field enabled the refinement of the length of stop analyses and lowered the number of flags being created for extended stops (i.e., we could now control for why the stop was extended). In many ways, the deputies are the best means of gathering information about stops and what is happening in the field; we encourage deputies to continue to use the comment field so that their experiences can be fully captured and accounted for in the data.

3. Situating the Analyses

In 2013, the MCSO came under a federal court order regarding racially/ethnically biased policing practices. As part of meeting the requirements of the court order, the MCSO contracted with the Center for Violence Prevention and Community Safety (CVPCS) to receive technical assistance to increase the data and analytical infrastructure surrounding the MCSO's traffic stop data analysis work group, and to enhance its capacity to collect, maintain, analyze, and disseminate traffic stop data. As part of this technical assistance, our team produces an annual report with a goal of evaluating the presence and extent of racially/ethnically biased policing within the MCSO's patrol function. To examine the relationship between racially/ethnically disparate policing and traffic stops within the patrol function of the MCSO, our team attempts to answer the following six research questions:

1. *Does descriptive, internal benchmarking identify any deputies who are engaging in policing behavior (i.e., arrest, search, seizures, and citations) towards race/ethnic minority drivers that is markedly different from their similarly situated peers?*

2. *In the fiscal year of 2016-2017, are there racial/ethnic differences in post-stop outcomes within the patrol function of the MCSO?*

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Throughout this report, we will refer back to these questions and determine if and how the coming analyses provide answers.

4. Characteristics of the Traffic Stop Data

Before discussing the data analyses, we begin by detailing how the final dataset was created, and the focal variables employed in the forthcoming analyses.

4.1 How the Final Dataset is Created

Below, in a step-wise fashion, we describe the process of building the 2016-2017 year of deputy-initiated traffic stop data. First, traffic stops in the final dataset should be limited to those stops that have been completed in the TraCS system, were not involved in training activities, and have a completed and validated status in the system. To capture only stops that are completed and validated in the TraCS system, we keep only stops where the "status" variable is equal to 90, which means that the stop entry has been reviewed and approved by a supervisor. Another means of identifying a training stop is through the agency variable. If Agency is labeled as -9 or missing, then the stop is considered a training stop. Next, if the deputy serial number variable starts with "ST," the stop is also considered a training stop. All of these types of stops were eliminated from the final data set.

Second, we extract duplicate cases created by deputies and sergeants. As mentioned earlier, only one duplicate stop was included in this year's data set. The duplicate of this stop is not included in the analyses.

The next step in creating the data is cleaning the variables. Without going into excessive detail, we recoded variables where needed, assigned missing values, and created variables for dates and times that are easily used in statistical analyses.

Additionally, there are a number of outside datasets that we bring into the TraCS data. Specifically, we add information on the deputy (age, race, tenure with the MCSO), special assignments and grant work, the stops' geolocations, and flags and supervisory discussion from previous data years. These datasets are joined to the TraCS data. Around March 2017, there were several changes made by the GIS department to the district and beat boundaries. These changes included eliminating the PRK (Parks) District, creating an "on water" beat in District 5 (i.e., Lakes), and changing the boundaries of several other beats. For consistency, we geocoded all stops to the new beat/district boundaries. This not only enables us to use consistent boundaries, but these boundaries will be used in the years to come.

The final step in creating the yearly data was to shape the data set "wide." A wide data set is one where each row in the data represents one traffic stop, and that row contains all the information about the traffic stop. However, the structure of the MCSO data in TraCS is not wide, but long, meaning there is one row per stop and an additional row for every passenger associated with the stop. The goal in reshaping the data was to put all information regarding a traffic stop on one row for ease of analysis. In the long dataset, there are 29,786 cases and these cases include rows for both the traffic stop information and the passenger information. Because both stops and passengers have rows, we do not have an accurate portrayal of the total number of stops. Once transformed into a wide dataset, the data set has 22,233 unique stops in the 2016-2017 year of deputy-initiated traffic stop data.[3]

[3] This number of stops is prior to the cleaning that occurs when conducting analyses.

4.2 Data

The primary source of data in this report is the TraCS data, which is one year of deputy-initiated traffic stops by MCSO deputies ranging from July 1, 2016 through June 30, 2017. For the analyses conducted across the first two years of TraCS data collection, we also use the TraCS data from the previous two years, which each contain one year of deputy-initiated traffic stops ranging from July 1, 2014 through June 30, 2015 and July 1, 2015 through June 30, 2016.

Moreover, we employ other sources of data exclusively for the coming inferential analyses. First, we include information on each deputy who appears in the TraCS data. After providing the MCSO with a list of deputy serial numbers appearing in the data, the MCSO returned that list attached with characteristics on each deputy. Information on deputies includes personal demographic characteristics (e.g., race/ethnicity, sex) and employment at the MCSO variables (e.g., hire date, rank). This data was attached to the TraCS data via the deputy's serial number.

Additionally, we merge information on special assignments and grant activities to each deputy. This enables us to designate stops that were conducted when a deputy was assigned to one of these duties.

Finally, all stops were geocoded using the 1993 Arizona State Plane coordinate system. Latitude and longitude coordinates were geocoded and subsequently matched to census blocks, block groups, and tracts, as well as the MCSO administrative boundaries such as beats and districts. Around March 2017, several changes were made by the GIS department to the district and beat boundaries. These changes included eliminating the PRK (Parks) District, creating an "on water" beat in District 5 (i.e., Lakes) and changing the boundaries of several other beats with the new boundary resulting in the beat changing districts. For consistency, we geocoded all stops to the new district boundaries. This not only enables us to use consistent boundaries, but these boundaries will be used in future research in the years to come.

In total, there are 23,618 geocoded, non-duplicative, approved and completed stops in the data year in the dataset. After data cleaning and the removal of missing information, the data is restricted to 22,233 stops.

Table 1 shows descriptive statistics for all traffic stops during this time. Whites have the largest percentage of traffic stops among drivers stopped by the MCSO (66.6%), followed by Hispanics (22.4%), then Blacks (7.7%), Asians (2.2%), and Native Americans (1.1%). Stops concluding with a citation are the most common type of stop (55.9%), followed by warnings (43.4%). Incidental contact stops are those where the deputy stops a vehicle due to reasonable suspicion, but it is determined no traffic violation or crime is committed (for example, an Amber alert). Incidental contact stops are relatively uncommon, constituting only 0.5% of stops in the data.

Table 1. Descriptive Statistics of Deputy-Initiated Traffic Stops

	Frequency	Percent
Race of Driver - All Race/Ethnicity		
White	14804	66.6
Native American	237	1.1
Hispanic	4985	22.4
Black	1707	7.7
Asian	500	2.2
Race of Driver - Hispanic vs. Non-Hispanic		
Hispanic	4985	22.4
Non-Hispanic	17248	77.6
Type of Stop		
Warning	9643	43.4
Incidental Contact	105	0.5
Long Form	50	0.2
Field Incident	5	0.0
Citation	12430	55.9
Any Arrest Type		
No	20927	94.1
Yes	1306	5.9
Arrest by Type		
Cite and Release Arrest	985	75.4
Booked into Jail	321	24.6
Searched		
No	21612	97.2
Yes	621	2.8
Search Type (Last 6 Months of Data)		
All Searches	303	100.0
Consent Searches	23	7.6
Seizure		
No	21433	96.4
Yes	800	3.6
Length of Stop		
0-20 min.	20397	91.7
21-59 min.	1327	6.0
60+ min.	509	2.3
Time of Day of Stop		
Stop Occured bewteen 12am-5:59am	2719	12.2
Stop Occured bewteen 6am-8:59pm	15701	70.6
Stop Occured bewteen 9pm-11:59pm	3813	17.2
N=	22233	

Table 2. Patterns and Seasonal Trends of Monthly Traffic Stops by District

	July '16	August '16	September '16	October '16	November '16	December '16	January '17	February '17	March '17	April '17	May '17	June '17	Total Stops in Year
Organization	8.8	7.2	9.1	6.6	8.4	6.5	8.4	8.4	11.7	7.3	8.0	9.6	22233
District													
1	15.3	15.3	12.8	15.1	13.4	8.5	14.6	16.1	13.8	16.1	16.0	19.9	3302
2	24.0	20.2	16.0	15.1	24.1	31.3	23.0	25.6	16.4	15.8	15.2	18.7	4499
3	23.0	23.0	15.3	26.4	17.6	10.4	27.8	22.6	20.6	27.2	18.8	20.6	4689
4	10.1	13.3	7.2	13.0	15.0	13.1	7.7	9.0	7.1	12.1	7.6	13.4	2332
5	2.6	2.4	2.9	5.2	8.1	16.3	5.1	2.6	3.3	2.5	1.6	2.0	951
6	15.6	14.2	37.8	15.3	11.3	9.9	11.2	16.6	32.8	11.0	18.2	14.1	4049
7	9.3	11.6	8.0	10.0	10.5	10.3	10.6	7.6	6.1	15.3	22.5	11.3	2411
	1,951	1,598	2,026	1,475	1,871	1,445	1,869	1,867	2,601	1,618	1,770	2,142	

Table 3. Age, Sex, Race, and AZ Vehicles Characteristics of Drivers by District

		Avg. Citizen Age	% Male	% White	% Native Am.	% Hispanic	% Black	% Asian	% AZ Plates	Total Stops in Fiscal Year
Organization		25.1	61.3	66.6	1.1	22.4	7.7	2.2	91.2	22233
District	1	23.7	9.3	9.2	0.3	3.4	3.4	3.4	94.0	3302
	2	21.8	13.1	8.5	0.2	8.5	8.5	8.5	88.6	4499
	3	26.9	13.0	14.4	0.1	4.6	4.6	4.6	88.8	4689
	4	25.0	6.8	8.9	0.0	1.0	1.0	1.0	91.3	2332
	5	24.1	3.1	3.2	0.0	0.8	0.8	0.8	87.6	951
	6	24.6	10.0	13.3	0.1	3.3	3.3	3.3	95.7	4049
	7	31.4	6.1	9.0	0.3	0.9	0.9	0.9	91.1	2411

Table 4. Traffic Stop Day of Week and Length of Stop Overall and By District

				Categories of Length of Stop, in Minutes							
		Total Stops	**% Weekday**	**%0-10**	**%11-20**	**%21-30**	**%31-40**	**%41-50**	**%51-60**	**%60+**	**% Missing**
Organization		22233	70.0	73.1	18.7	2.8	2.2	1.0	0.7	2.3	0.0
District	1	3302	67.1	67.3	20.5	3.9	2.8	1.4	1.1	3.8	0
	2	81621	71.6	75.6	16.3	2.7	2.4	1.0	0.8	2.2	0
	3	4689	66.4	73.2	19.0	2.3	2.1	1.1	0.7	2.1	0
	4	2332	71.1	70.6	20.2	3.0	1.6	1.0	0.8	3.5	0
	5	951	43.1	72.7	18.2	2.7	1.7	0.6	0.6	4.1	0
	6	4049	82.8	75.6	17.6	2.6	2.5	0.9	0.4	1.0	0
	7	2411	65.9	74.5	20.5	2.5	1.2	0.4	0.4	1.0	0

Several other outcomes associated with traffic stops are also rare. For example, 5.9% of stops result in arrest. Finally, items are seized from drivers in 3.6% of cases. Tables 2, 3, and 4 provide more information for all stops; the trends in these descriptive findings are summarized below.

The majority of traffic stops had the following characteristics:

- Occurred on a weekday (70.0%)
- Occurred during the midday hours between 6:00am and 8:59pm (70.6%)
- Lasted between less than a minute and 20 minutes (0 through 20 minutes: 91.7%; more than 60 minutes: 2.3%)
- March 2017 had the largest percentage of traffic stops (11.7%) overall. Stop activity within the patrol function of the MCSO was fairly consistent across months, with a difference of 5.2% between the busiest and slowest months

When looking at the overall patrol function of the MCSO, drivers involved in traffic stops were:

- On average, approximately 25.1 years of age
- Predominantly male (61.3%)
- Predominantly White (66.6%) or Hispanic (22.4%)
- Drove a vehicle with license plates issued by the State of Arizona (91.2%).

At the district level, characteristics of drivers were more varied:

- Drivers involved in traffic stops were consistently predominantly male and Arizona drivers
- The average age of drivers ranged from the mid-20s to early 30s

Some variation in racial or ethnic backgrounds of drivers stopped across districts can be expected. This is due to the demographic composition of residents and travelers in these districts, along with differences in the driving population in these areas.

5. Internal Benchmarking with Basic and Descriptive Statistics

Throughout this report, we employ varying forms of internal benchmarking to examine whether there are differences in traffic stops and post-stop outcomes by driver race/ethnicity. In general, internal benchmarking are analyses that compare the stop decisions of one deputy to the stop decisions of other deputies working in similar situations (Walker, 2001). In simple terms, internal benchmarking identifies outliers. Internal benchmarking provides law enforcement agencies a means of self-assessment and the opportunity to define best practices for their department. Moreover, internal benchmarking moves away from external benchmarks – where the benchmark is instead some outside baseline that is applied to the stop data. An example of an external benchmarking procedure would be to compare a deputy's percentage of minority stops in a neighborhood to the percent minority drivers in a neighborhood. If a deputy is stopping more minorities than are driving in an area, this is a point of concern. However, data on minority drivers in geographic units is near impossible to obtain (Ridgeway and MacDonald, 2010; Ridgeway and MacDonald, 2014). As a consequence, most law enforcement agencies turn to some form of internal benchmarking to determine if there is evidence of racially biased policing occurring in their agency (Ridgeway and MacDonald, 2010; Walker, 2001).

There are several limitations associated with internal benchmarking. First, if the majority of officers (we refer to officers here as a general term to include all law enforcement agents in a patrol function) within a specific unit are biased, there will be no outliers. Internal benchmarking is best used to identify a few officers acting outside of typical parameters. This is most problematic when racially biased policing is endemic across all officers and aggregate units (i.e., supervisors, police beats, etc.) within an agency. Second, officers who are outliers may have legitimate reasons for being so. Ridgeway and MacDonald (2010) provide a good example of such a circumstance: "a Spanish-speaking officer may appear to have an excessive number of stops of Hispanic suspects, when, in fact, the Spanish-speaking officer gets called in to handle and document those stops" (p. 189). Thus, as most scholars recommend, internal benchmarking should be used as a problem identification tool rather than the sole source of information on whether an officer is engaged in racially biased policing (Walker, 2001).

Finally, many means of internal benchmarking are generally "raw" in the sense that they do not control for other aspects of the stop that may be related to differential outcomes by deputy and race of the driver. As such, when using high ratios (what constitutes a high ratio will be described shortly) to set alerts on potentially biased law enforcement behavior by deputies, sergeants and other commanding officers should take into consideration the context of the stops by a particular deputy prior to formally setting an alert.

Internal benchmarking is commonly used among law enforcement agencies to identify disparate officer activities (Walker, 2001). This analysis is no different: we use multiple forms of internal benchmarking. In this section, "Internal Benchmarking with Basic and Descriptive Statistics," differences across race and ethnicity in traffic stop outcomes are examined. Descriptive statistics – primarily ratios – are employed in these analyses. Our analyses begin by examining the frequency of stops by driver race/ethnicity among deputies and contrasting their stop patterns to that of their "comparable peers," or deputies making stops in the same district, using a series of ratios. After, we move on to contrasting post-stop outcomes by driver race/ethnicity among deputies and their comparable peers (also using ratios).

We construct ratios for each deputy to examine their behavior in contrast to the behavior of other deputies. For ease of discussion, we refer to the deputy we are analyzing as "Deputy A." Put simply, we compare Deputy A's stop rates in a district to the stop rates of other deputies who make traffic stops in the same district. More specifically a ratio is calculated as follows:

$$ratio = \frac{\left(\frac{Deputy\ A's\ \#\ of\ stops\ by\ race\ in\ District\ X}{Deputy\ A's\ \#\ of\ stops\ in\ District\ X}\right)}{\left(\frac{\#\ of\ stops\ by\ race\ in\ District\ X}{\#\ of\ stops\ in\ District\ X}\right)}$$

Here, Deputy A represents the deputy for whom the ratio is being calculated and District X represents the district in which Deputy A has conducted the examined stops. "Stops by race" represents the type of stop (e.g., citation, warning, arrest, etc.) that is being examined by the specific race/ethnicity of the driver that is being examined (e.g., White, Black, Hispanic, etc.). Finally, "stops" is the total number of the type of stop (e.g., citation, warning, arrest, etc.) that is being examined for all drivers in District X.

To illustrate how a ratio is calculated, we show Deputy A's stops that concluded with Hispanic arrests in District 1. Deputy A has made 21 arrests in District 1 between July 2016 and June 2017. Of those 21 arrests, 9 have been of Hispanic drivers. These two numbers give us the numerator to the ratio formula.

Next, in District 1, all deputies working in the district conducted 282 arrests between July 2016 and June 2017. Of those 282 arrests, 79 are of Hispanic drivers regardless of which deputy conducts the arrest. These numbers give us the denominator. Thus, Deputy A's ratio for arrests of Hispanics drivers in District 1 is constructed as follows:

$$Deputy\ A's\ ratio = \frac{\left(\frac{9}{21}\right)}{\left(\frac{79}{282}\right)} = \frac{0.4286}{0.2801} = 1.53$$

Once the ratio is calculated, if it is sufficiently high (typically over 2.0), then it demonstrates that the deputy stop rates are notably different from his/her peers. The ratio can be interpreted in the following way: 0 to 1.5 suggests little to no evidence of difference in stop behavior; 1.5 to 1.99 suggests that the deputy is stopping a certain race/ethnicity at a higher rate than the average for the district or the full patrol function of the MCSO; and 2.0 or higher shows that the deputy is stopping a certain race/ethnicity at least two times the rate of the average deputy at the district or patrol function of the MCSO (Lamberth, 1996). In this sense, the unit of analysis for the ratio analysis is the deputy-district combination.

The use of a specific ratio for a benchmark, in this case 2, is consistent with prior research on racial profiling or racially-biased policing by law enforcement (Lamberth, 1996). If we turn back to the example of Deputy A above, we see that Deputy A has a ratio of 1.53 for arrests of Hispanics drivers in District 1. Thus, Deputy A is arresting Hispanic drivers at 1.53 times more frequently than other deputies making stops within District 1.

In addition to the ratio analyses, this report uses simple inferential statistics, like χ^2 (chi-square), Cramer's V, and ANOVA. The χ^2 test is a means of examining the presence of a relationship between two categorical variables. In this report, the χ^2 test is used to examine if there is an overall relationship between two categorical variables (the race/ethnicity of the driver and the stop outcome) in a contingency table.

For an example, see Table 7 on page 27.[4] If a χ^2 test is significant, then there is a relationship between the two variables of interest.

The χ^2 test is often coupled with the Cramer's V, which is a measure of association. If a χ^2 test is significant, conducting a Cramer's V will reveal how strong the relationship is between the two variables used in the χ^2 test.[5] When the Cramer's V is between 0 and 0.29, the relationship between the two variables of interest is considered weak; when the Cramer's V is between 0.30 and 0.59, the relationship between the two variables of interest is considered moderately strong; and when the Cramer's V is over 0.60, the relationship between the two variables is strong.

Like a χ^2 test, ANOVAs are used when examining overall patterns,[6] however, ANOVAs examine the relationship between a categorical variable and a numeric variable. An ANOVA is also known as an F-test,[7]

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[4] The formula for the χ^2 test is as follows: $\chi^2 = \sum_{i=1}^{k} \frac{(f_o - f_e)^2}{f_e}$, where f_o represents the observed cell frequencies in the table, f_e represents the expected frequencies in the table if there was no relationship between the two variables, $\sum$ symbolizes that the equation should be done for each cell then added together, for the k number of cells in the table, starting at the first cell, or $i = 1$. The expected frequency, f_e, is calculated as $f_e = \frac{RT \; x \; CT}{n}$, where RT is the row total (i.e., the total number of tops in that row) for the cell, CT is the column total (i.e., the total number of tops in that column) for that cell, and n is the total number of stops.

[5] The equation for the Cramer's V is as follows: $= \sqrt{\frac{\chi^2}{n(k-1)}}$, where χ^2 represents the value of the previously conducted χ^2 test, n is the total number of cases in the analysis, and k is the number of rows or the number of columns in the contingency table, whichever is smaller.

[6] Note that while both the χ^2 and ANOVA statistics are useful for showing overall patterns, they do not include controls for other contexts that make generate differences in stops across race. For that, we turn to more complex, inferential analyses to determine systemic bias.

[7] The formula for an ANOVA or F-test is as follows: $F = \frac{\left(\sum_i \sum_k (\bar{X}_k - \bar{X}_{grand})^2 / _{k-1}\right)}{\left(\sum_i \sum_k (x_{ik} - \bar{X}_k)^2 / _{n-k}\right)}$, where x_{ij} is person i in group k, $\bar{X}_k$ is the mean for group k, $\bar{X}_{grand}$ is the overall mean for all people in all groups, k represents the specific group k, and n represents the total number of people in the analysis. To verbally walk through the equation, the top portion of the equation tells us to "start with the first group (k=1) and that the first persion in this group (i=1), subtract the group mean from this x_i score, square the difference, repeat this for each person in the first group, and then sum the squared differences. Then, go to the first person in the second group (k=2) and do the same thing for each person in this group" (Bachman & Patternoster, p. 462). Once that is done for all groups and all people, then you simply divide by the total number of groups minus one. The bottom portion of the equation tells us to "take the first group mean and subtract the gran mean from that and square the difference, then do the same for each of the i people in the group and then sum over the number of cases in that group" (Bachman & Patternoster, p. 462). Then, when this is completed for all groups and all people, then you simply divide by the total number of people minus the total number of groups. A significant F-test will show that there is a relationship between the two variables of interest in the ANOVA, or F-test.

where if the F-test is statistically significant, there is a relationship between the two variables of interest. In this report, ANOVAs are used to assess whether length of stop is dependent on the race of the driver.

Finally, p-values are presented throughout this report for all inferential statistics used, represented as * or $p < 0.05$. However, the meaning of p-values is not always clear, even though they are the core to understanding whether statistical results are significant. As a bit of a background, behind all statistical tests lies a null hypothesis. The null hypothesis tests "there is no difference between the observed data and what is expected" or "there is no relationship between two variables" or simply, "there is no effect." Very basically, the null hypothesis suggests nothing of interest is going on in the data.[8] The p-value of a statistical test establishes "the strength of the evidence against the null hypothesis" (Goodman, 2008; p. 135). The p-value of a statistical test establishes "the strength of the evidence against the null hypothesis" (Goodman, 2008; p. 135). The p-value tells us the probably that a statistical result *at least as strong* as what we observe in our data could occur if the null hypothesis is true. If the p-value is low, then it tells us that the data are highly unlikely to originate from a process in which the null is true, hence eroding support for the null hypothesis. For instance, say we want to determine if a driver's type of vehicle (i.e., car, truck, van or SUV) is related to their sex (i.e., male or female). We believe there is a relationship here, so our null hypotheses would be that there is no relationship between driver sex and vehicle type. We test whether there is a relationship between driver sex and vehicle type through χ^2 test; we find that the χ^2 test has a low p-value of 0.03. How do we interpret this? A p-value of 0.03 shows there is only a 3% chance that the null hypothesis is true. Put another way, it is very unlikely (in fact, only a 3% chance) of there being *no* relationship between driver sex and vehicle type. Thus, when interpreting the results of the statistical tests in this report, if the p-value is less than 0.05 (i.e., $p < 0.05$), then we interpret the test as significant, showing a high likelihood of an existing relationship between two variables.

In the coming sections, we present condensed versions of the ratio benchmarks and other statistics used to examine whether racial/ethnic disparities exist in post-stop outcomes. These statistics are available in their uncondensed form in the appendices. In the ratio analyses, we employ the following variables: driver race/ethnicity, arrest, search, citations, warnings, incidental contact, seizure, and length of stop. First, the driver's race/ethnicity was recorded based on the post-stop perceived race or ethnicity recorded on the TraCS form by the deputy; available categories include White, Native American, Asian, Black, or Hispanic. Next, arrest indicates that the driver was arrested during the traffic stop, regardless of whether that arrest was a "cite and release" type of arrest or the driver was booked into jail. Next, ratio analyses include the outcome of search, which is inclusive of all searches. We also estimate ratios by race/ethnicity for seizures, which include the seizing of items from the driver, such as drugs, weapons, drug paraphernalia, or stolen goods. Finally, we analyze ratios for the three types of stops: citations, warnings, and incidental contacts. Incidental contact stops include stops where the deputy has contact with the driver, but determines any type of post-stop outcome is not warranted. An example would be pulling over a vehicle in the carpool lane, only to find that there are two passengers in the car.

These analyses are meant to answer the first research question: "Does descriptive, internal benchmarking identify any deputies who are engaging in behavior (i.e., arrest, search, seizures, and citations) towards minority race/ethnicity drivers that is markedly different from their similarly situated peers?" Note that the statistics employed here do not control for underlying circumstances that may make certain rates and ratios seem high; an example would be a stop of a Hispanic is more likely to take place in a Hispanic neighborhood. As a result, it is important to note that the forthcoming findings show descriptive

[8] We employ null hypotheses so that scientists do not bias their own results. If we look to prove that there is not a relationship and the results of our inquiry establish there is one, then the structure of our inquiry is, at least, not biased by what we as scientists expect to happen.

relationships only, and any flags that are generated from these analyses should undergo further scrutiny within the MCSO before the flag is turned into an alert for a deputy.

5.1 Post-Stop Outcomes: Citation, Warning, and Incidental Contact by Race/Ethnicity

Table 5 shows the descriptive statistics regarding overall percentages of the type of stop (incidental contact, warning, and citation) by driver race/ethnicity which are compared to deputy performance on the ratios associated with those outcomes. Table 5, and all other subsequent tables showing ratio results, have four statistical columns. The first column, "Percent of Incidental Contacts by Race Distribution" shows the overall percentage of incidental contacts by race/ethnicity. For instance, 60% of all incidental contacts involve White drivers and 27.6% of all incidental contacts involve Hispanic drivers. Next, the column "Number of Non-Duplicate Deputies Making Stops by Race" shows how many deputies are making incidental contact stops for each specific driver race/ethnicity. As an example, eight deputies made incidental contact stops of Black drivers. Next, the column "Number of Non-Duplicate Deputies with a Ratio over 2" shows how many of the deputies who made incidental contacts of a specific race/ethnicity have a corresponding ratio that is 2 or above. Lastly, the column "Percent of Non-Duplicate Deputies with a Ratio over 2" shows the percent of deputies who would get flagged with a ratio of 2 or over. For example, 22.2% of deputies making incidental contact stops of Black drivers would be flagged (i.e., 6/8 = 0.75 or 75%).

Table 5. Descriptive Statistics of Stop Patterns Regarding District-Level Differences by Race/Ethnicity and Deputy Comparisons

Incidental Contact				
	Number of Incidental Contacts by Race Distribution	Number of Non-Duplicate Deputies Making Stops by Race	Number of Non-Duplicate Deputies With a Ratio Over 2	Percent of Non-Duplicate Deputies With a Ratio Over 2
White	63	49	5	10.204
Native American	1	1	1	100.000
Hispanic	29	21	15	71.429
Black	8	8	6	75.000
Asian	4	4	4	100.000
Warning				
	Number of Warnings by Race Distribution	Number of Non-Duplicate Deputies Making Stops by Race	Number of Non-Duplicate Deputies With a Ratio Over 2	Percent of Non-Duplicate Deputies With a Ratio Over 2
White	6594	313	9	2.875
Native American	80	56	45	80.357
Hispanic	2004	254	60	23.622
Black	740	205	68	33.171
Asian	225	120	60	50.000
Citation				
	Number of Citations by Race Distribution	Number of Non-Duplicate Deputies Making Stops by Race	Number of Non-Duplicate Deputies With a Ratio Over 2	Percent of Non-Duplicate Deputies With a Ratio Over 2
White	8115	292	15	5.137
Native American	155	73	41	56.164
Hispanic	2937	250	59	23.600
Black	954	185	69	37.297
Asian	269	123	65	52.846

Beginning with incidental contact stops, 60% of all incidental contact stops involve White drivers. Hispanic drivers make up the next highest proportion of incidental contact stops at 27.6% of all incidental contact stops. Also note that incidental contact stops are rare: only 0.5% of stops in this study year were incidental contact stops. Thus, because there are only a small number of incident contact stops, it is difficult to determine if any deputies are potentially engaged in problematic policing. For example, one deputy made an incidental contact stop of a Native American driver. Given that incidental contact stops of Native American drivers are very rare and other deputies are unlikely to do them, that deputy was flagged given that they are the only deputy making that type of stop and will always appear as if they are making drastically higher numbers of this type of stop when compared to other deputies (see Appendix A for a more through explanation of why low numbers of stops impact deputy's ratios).

Next, stops that result in a warning are much more common. First, 68% of warnings go to White drivers, 21% go to Hispanic drivers, 8% go to Black drivers, 2% go to Asian drivers, and under 1% go to Native American drivers. This distribution of warnings across driver race is similar to the overall distribution of driver race/ethnicity (see Table 1). The next column, "Number of Non-Duplicate Deputies Making Stops by Race," shows the number of deputies who made warnings by each driver race/ethnicity. Here, 313 deputies gave White drivers warnings, 56 deputies gave Native American drivers warnings, 254 deputies gave Hispanic drivers warnings, 205 deputies gave Black drivers warnings, and 120 deputies gave Asian drivers warnings. The next column shows the number of those deputies who gave out warnings who also had a ratio over 2; put another way, the number of deputies who gave out warnings at a rate that was two times higher than other deputies working in the same district. The final column, "Percent of Non-Duplicate Deputies With a Ratio Over 2," shows how common it is among deputies to have a rate of warnings, by race/ethnicity, that is two times higher than other deputies working in the same district. Approximately 80.4% of deputies have rates that are two times (or more) higher than the district average for Native American drivers; keep in mind, though, stops of Native Americans are not very common. Approximately 33.2% and 50% of deputies, who have stops that result in warnings, have warning rates that are at least two times higher than the district average for stops involving Black and Asian drivers. Approximately 23.6% of deputies also have warning rates that are at least two times higher than the district average for stops involving Hispanic drivers. Lastly, only 2.9% of deputies have a ratio of over 2 for stops involving warnings to White drivers.

Finally, like warnings, stops that result in a citation are much more common than incidental contacts. First, 65% of citations are to White drivers, 24% of citations are to Hispanic drivers, 8% of citations are to Black drivers, 2% of citations are to Asian drivers, and just over 1% of citations are to Native American drivers. This distribution of citations across driver race/ethnicity is similar to the overall distribution of driver race (see Table 1). As shown in the last column, for stops that result in citations, we see that 56.2% of deputies have rates that are two or more times higher than the district average for stops involving citations and Native American drivers. Notably, for deputies that have stops resulting in a citation 37.3% and 52.8% of deputies have rates that are two times (or more) higher than the district average for Black and Asian drivers, respectively. Additionally, 23.6% of deputies have rates that are two or more times higher than the district average for stops involving citations and Hispanic drivers. Appendices B, C and D contain each deputy's ratio by race/ethnicity for the comparison between deputy and district for each type of stop: incidental contact, citation, and warning.

5.2 Post-Stop Outcomes: Arrest by Race/Ethnicity

5.2.1 Descriptive Statistics for Arrest

Racially/ethnically biased policing occurs when individuals who come into contact with law enforcement agents experience differential outcomes due to their race/ethnicity. Here, we examine if this holds true for arrests during the current year of traffic stop data. There are two important caveats regarding these analyses. First, arrests do not occur very frequently; as such, caution should be used when interpreting the descriptive statistics presented in Table 6, particularly regarding ratios. Second, the statistics below look at all arrests, and do not account for whether the arrest was discretionary; all types of arrests are included in these analyses. Thus, the results of the coming analyses should be also considered with this in mind.

Table 6. Descriptive Statistics of Arrest Patterns Regarding District-Level Differences by Race/Ethnicity and Deputy Comparisons

	Number of Arrests by Race Distribution	Number of Non-Duplicate Deputies Conducting Arrests by Race	Number of Non-Duplicate Deputies With a Ratio Over 2	Percent of Non-Duplicate Deputies With a Ratio Over 2
White	681	152	8	5.263
Native American	27	21	17	80.952
Hispanic	425	132	36	27.273
Black	161	75	38	50.667
Asian	12	11	11	100.000

Table 6 shows descriptive statistics comparing deputies' rates of arrest by driver race/ethnicity to the district average rate of arrest by driver race/ethnicity. Of the 5.9% of all traffic stops that result in arrest (see Table 1), 32.5% of those arrests are of Hispanics, compared to 52.1% of arrests are of White drivers, 2.1% of arrests are of Native American drivers, 12.3% of arrests are of Black drivers, and less than 1% of arrests are of Asian drivers.

Next, we examine the percentage of deputies who have conducted arrests are over a ratio of 2 for specific arrests by driver race/ethnicity. Approximately 5.3% of deputies arrest Whites at a rate two times higher than the district average, while 27.3% and 50.7% of deputies arrest Hispanics and Blacks at a higher rate than the district average. In addition, 81.0% of deputies arrest Native Americans and 100% of deputies arrest Asians at higher rates than the district average. Note though, that both Native American and Asian arrests are very rare, making it difficult to establish if there is problematic policing occurring among deputies making arrests of Native Americans or Asians. Appendix E shows all race/ethnicity ratios for arrest for each deputy and the districts they make stops in.

5.2.2 Is There a Relationship between Driver's Race/Ethnicity and Arrests?

To test the relationship between whether the driver was arrested and the driver's race/ethnicity within the patrol function of the MCSO, we conducted a χ^2 test coupled with a Cramer's V statistic.[9] Note that the race/ethnicity of the driver is determined by the deputy: Arizona does not record driver's race/ethnicity on licenses. Deputies are required to note what race or ethnicity they perceive the driver to be.

Table 7 shows the frequencies of the relationship between arrests and Hispanics. As the results demonstrate in Table 7, there is a statistically significant relationship between whether the driver was arrested and Hispanic drivers. The Cramer's V statistic is small at 0.061. This suggests that while there is a relationship between arrest and the driver's Hispanic ethnicity, it is a weak relationship.

Table 7. Relationship between Arrest and Hispanics

	No Arrest	Arrest	Total
Non-Hispanic	16367	881	17248
Hispanic	4560	425	4985
Total	20927	1306	22233
Chi-Square	81.701*		
Cramer's V	0.061		
* p<0.05			

Table 8. Relationship between Arrest and Post-Stop Driver Race/Ethnicity

	No Arrest	Arrest	Total
White	14123	681	14804
Native American	210	27	237
Hispanic	4560	425	4985
Black	1546	161	1707
Asian	488	12	500
Total	20927	1306	22233
Chi-Square	169.885*		
Cramer's V	0.087		
*p < 0.05			

Table 8 examines the relationship between each race/ethnicity and arrests. Similarly, the result of the chi-square test shows a significant chi-square statistic, suggesting that there is a relationship between

[9] Remember that the Cramer's V is a measure of association that informs us of the strength of the relationship between two variables being employed in a χ^2 analysis. The Cramer's V statistic can take any value between 0 and 1 and can be interpreted in the following way: values between 0 and 0.29 show a weak relationship, values between 0.3 and 0.59 show a moderately strong relationship, and values ranging from 0.6 to 1 show a strong relationship.

whether the driver was arrested and the race/ethnicity of the driver. That said, the Cramer's V statistic is low at 0.087. Again, this suggests that while there is a relationship between arrest and the driver's race/ethnicity, it is a weak relationship.

5.3 Post-Stop Outcomes: Searches by Race/Ethnicity

5.3.1 Descriptive Statistics for Searches

Similar to how we examined arrests, here we examine whether a deputy's rate of searches by race/ethnicity is similar to their similarly situated peers. One important limitation to note regarding the coming analyses is that searches do not occur very frequently; because searches are a low baseline stop, caution should be used when examining deputies' ratios. Next, we examine all searches regardless of whether they are discretionary or not. This should be considered when interpreting the results of the upcoming analyses. Indeed, of all the traffic stops conducted by the MCSO, only 2.8% of stops involved searches (see Table 1).

Table 9 shows descriptive statistics comparing deputies' rates of search by driver race/ethnicity to the district average rate of search. First, all deputies who searched Native Americans and Asians have been flagged. This suggests that the low occurrence of these types of stops contributes to higher ratios for deputies.[10] Nearly 51% of all searches are of White drivers, while 2% are of Native American drivers, 33.2% are of Hispanic drivers, 12.6% are of Black drivers, and finally, 1.5% of all searches are of Asian drivers. Of the deputies who conducted searches of Blacks and Hispanics, 33.7% and 62.2% respectively are flagged as searching Blacks and Hispanics at a rate that is two times (or more) higher than their district average. The percentage of deputies with a ratio of over 2 for searches of Native Americans and Asians is 100%: this large percentage is due to the infrequency of searches of Native American and Asian drivers. Appendix F shows all race/ethnicity ratios for search for each deputy and the districts they make stops in.

Table 9. Descriptive Statistics of Search Patterns Regarding District-Level Differences by Race/Ethnicity and Deputy Comparisons

	Number of Searches by Race Distribution	Number of Non-Duplicate Deputies Conducting Searches by Race	Number of Non-Duplicate Deputies With a Ratio Over 2	Percent of Non-Duplicate Deputies With a Ratio Over 2
White	316	112	23	20.536
Native American	12	9	9	100.000
Hispanic	206	95	32	33.684
Black	78	45	28	62.222
Asian	9	8	8	100.000

[10] As an example, consider the following numbers from a deputy in this year's data. In District 1, of the 282 arrests, 5 arrests were of Asian drivers. This amounts to a district rate of Asian arrest 0.0177 (i.e., 5/282). Deputy A, made 16 arrests in District 1, and one arrest was of an Asian driver. So this deputy's personal rate of Asian arrest is 0.625 (i.e., 1/16). To construct the deputy's ratio, we place the deputy's rate of Asian Arrest over the rate of Asian Arrest in District 1, or 0.625/0.0177, which amounts to a ratio of 35.31. This deputy would receive a flag based on only 16 total stops. Thus, when there are lower numbers of stops in for the outcome of interest, ratios should be treated with caution.

5.3.2 Is there a Relationship between Driver's Race/Ethnicity and Searches?

To test the relationship between whether the driver was searched and the driver's race/ethnicity within the patrol function of the MCSO, we conducted a chi-square test coupled with a Cramer's V statistic. As the significant chi-square statistic ($p < 0.05$) in Table 10 shows, there is a relationship between whether the driver was searched and the ethnicity (Hispanic) of the driver. That said, the Cramer's V statistic is low at 0.044. This suggests that while there is a relationship between the driver's ethnicity and search, it is a weak relationship.

Table 10. Relationship between Hispanics and Searches

	No Search	Search	Total
Non-Hispanic	16833	415	17248
Hispanic	4779	206	4985
Total	21612	621	22233
Chi-Square	42.448*		
Cramer's V	0.044		
* $p < 0.05$			

Table 11. Relationship between Driver Race/Ethnicity and Search

	No Search	Search	Total
White	14488	316	14804
Native American	225	12	237
Hispanic	4779	206	4985
Black	1629	78	1707
Asian	491	9	500
Total	21612	621	22233
Chi-Square	82.731*		
Cramer's V	0.061		
$p < 0.05$			

Table 11 examines this relationship across race/ethnicity. The significant chi-square statistic shows that there is a relationship between whether the driver was searched and the race/ethnicity of the driver within the patrol function of the MCSO. However, the Cramer's V statistic is low at 0.061, suggesting that the relationship between being searched and the driver's race/ethnicity is a weak one.

5.4 Post-Stop Outcomes: Seizures by Race/Ethnicity

5.4.1 Descriptive Statistics for Seizures

We examine whether seizures of items from drivers are differentially experienced by minority drivers (relative to White drivers) in the third year of traffic stop data from fiscal year 2016-2017. Note that in these analyses, seizures do not occur frequently. Of the 22,233 total traffic stops conducted by the MCSO, 3.6% of stops involve a seizure. Note that a seizure can constitute any item that was confiscated from the driver, and may include driver's licenses, license plates, drugs, or other types of contraband. Thus, descriptive statistics presented in Table 12 should be considered with caution.

Table 12. Descriptive Statistics of Seizure Patterns Regarding District-Level Differences by Race/Ethnicity and Deputy Comparisons

	Number of Seizures by Race Distribution	Number of Non-Duplicate Deputies Conducting Seizures by Race	Number of Non-Duplicate Deputies With a Ratio Over 2	Percent of Non-Duplicate Deputies With a Ratio Over 2
White	428	123	21	17.073
Native American	21	11	10	90.909
Hispanic	222	83	28	33.735
Black	112	51	26	50.980
Asian	17	11	10	90.909

Table 12 compares deputies' rates of seizures by drivers' race/ethnicity to the district average rate of seizures by race/ethnicity. Of the 3.6% of stops that result in a seizure, 53.5% of them occur among White drivers, 2.6% of seizures occur among Native American drivers, 27.7% of seizures occur among Hispanic drivers, 14% of seizures occur among Black drivers, and finally 2.1% of seizures occur among Asian drivers. When comparing deputies' rates of seizures to the district rate of seizures: 17.1% of deputies seize items from White drivers at a higher rate than the district average, while 33.7% and 50.9% of deputies seize items from Hispanic and Black drives at a higher rate than the district average. As seen in previous analyses such as those for search, there is a very high percentage of deputies who have a ratio of over 2 for seizures of Native Americans and Asian drivers. Given how infrequently seizures occur, these numbers should be examined with caution. Appendix G contains each deputy's ratio by race/ethnicity for the deputy-district comparison for seizures.

5.4.2 Is there a Relationship between Driver's Race/Ethnicity and Seizures?

To test the relationship between whether items were seized from the driver and the driver's post-stop perceived race/ethnicity within the patrol function of the MCSO, we conducted chi-square tests coupled with a Cramer's V statistic. Table 13 shows the significant chi-square statistic ($p<0.05$), indicating there is a relationship between whether items were seized from the driver and the post-stop perceived ethnicity (Hispanic) of the driver within the traffic patrol function of the MCSO. That said, the Cramer's V statistic is low at 0.025. This suggests that while there is a relationship between items being seized from the driver and their post-stop perceived ethnicity, it remains a weak one.

Table 14 shows there is a statistically significant relationship ($p<0.05$) between whether items were seized from the driver and the post-stop perceived race/ethnicity of the driver within the patrol function of the MCSO. The Cramer's V statistic, again, is low at 0.065; this suggests that while there is a relationship between seizure and the driver's post-stop perceived race/ethnicity, it is weak.

Table 13. Relationship between Seizures and Hispanic Drivers

	No Seizure	Seizure	Total
Non-Hispanic	16670	578	17248
Hispanic	4763	222	4985
Total	21433	800	22233
Chi-Square	13.545*		
Cramer's V	0.025		
$p < 0.05$			

Table 14. Relationship between Seizures and Driver Race/Ethnicity

	No Seizure	Seizure	Total
White	14376	428	14804
Native American	216	21	237
Hispanic	4763	222	4985
Black	1595	112	1707
Asian	483	17	500
Total	21433	800	22233
Chi-Square	94.030*		
Cramer's V	0.065		
$p < 0.05$			

5.5 Post-Stop Outcomes: Length of Stop by Race/Ethnicity

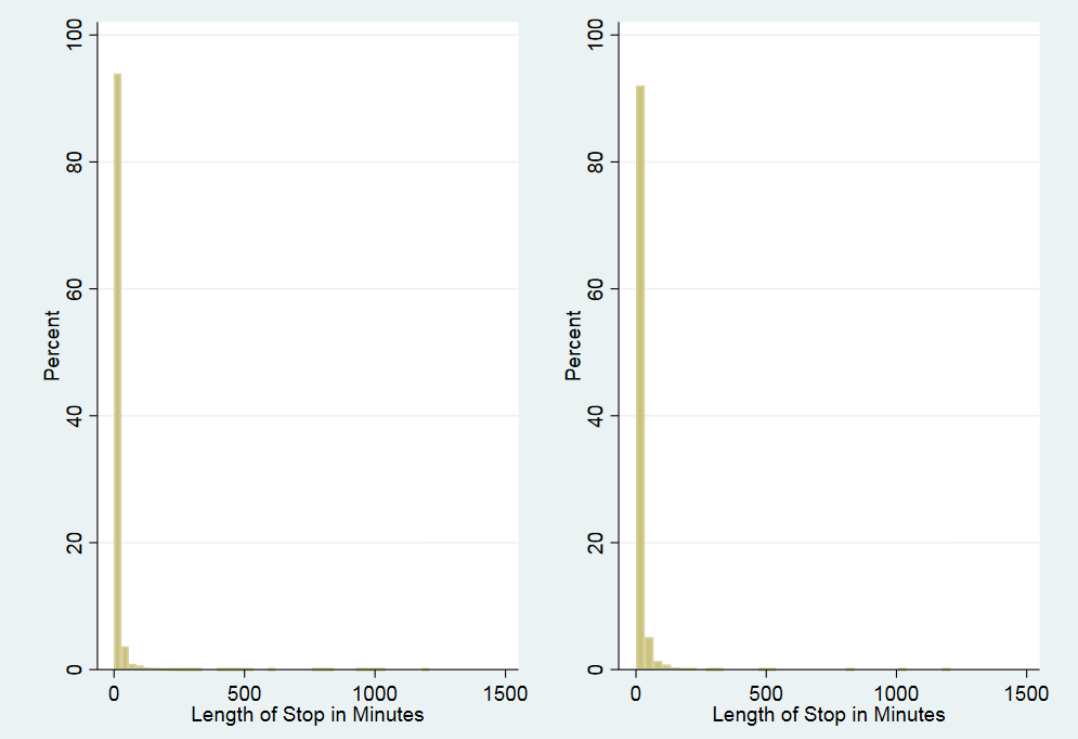
5.5.1 Descriptive Statistics for Length of Stop

As shown in Table 15, the average length of stop for all deputy-initiated stops is approximately 13.8 minutes, with a standard deviation of 32.3 minutes. The standard deviation is rather large, but that is expected given that certain traffic stops, such as those involving arrests for example, can be rather lengthy. For instance, the longest stop was 1207 minutes (over 20 hours), while the shortest length of stop was less than a minute (i.e., 0). Additionally, the distribution of length of the stop is strongly positively skewed; put more simply, the bulk of the stops have a shorter length of stop, with only a few stops having much longer lengths. Figure 2 shows the distribution of length of stops for all calls (on the left) compared to the distribution of length of stops for only stops involving Hispanic drivers (on the right).

Table 15. Descriptive Statistics of Length of Stop by Extended and Non-Extended Stops

	Average	Standard Deviation	Minimum	Maximum
All Stops	13.758	32.338	0	1207.562
Non-Extended Stops	11.736	29.431	0	1030.068
Extended Stops	31.806	47.822	0	1207.562
N=22233				

Figure 2. Histogram of Length of Stop for all Stops (Left) v. Histogram of Length of Stop for Stops of Hispanic Drivers (Right)



We can further differentiate length of stop by the characteristics of the stop. As mentioned before, stops involving an arrest or search will naturally take longer. We can consider two different types of stops: extended stops, which include stops where the deputy indicated there was a vehicle tow, a DUI, a language barrier, a training deputy, or a technical issue, and non-extended stops, which do not involve any of those characteristics. Table 15 shows the descriptive statistics for the length of stop by extended versus non-extended stops. The average length of a non-extended stop within the patrol function of the MCSO is 11.7 minutes, with a standard deviation of 29.4 minutes. The average length of an extended stop within the patrol function of the MCSO is 31.8 minutes, with a standard deviation of 47.8 minutes. The overall length of stop for all of the MCSO patrol is 13.76 minutes.

5.5.2 Is there a Relationship between Length of Stop and Driver's Race/Ethnicity?

Next, we examine whether there are significant differences in the average length of stops by race/ethnicity. In Table 16, on average, White drivers are stopped for 12.78 minutes, while Hispanic drivers are stopped for 15.868 minutes, and Native American drivers are stopped for 14.966 minutes. An analysis of variance (ANOVA) test was conducted to test differences in the length of stop across driver race/ethnicity. The results of the F-Test presented in Table 16 indicate there are significant differences in the length of stop across racial and ethnic groups. Simply stated, the length of a stop is dependent on the race/ethnicity of the driver.

Table 16. The Relationship between Length of Stop and Driver Race/Ethnicity

	Average	Standard Deviation	Minimum	Maximum
White	12.783	30.769	0.000	1019.449
Native American	14.966	17.474	3.034	122.880
Hispanic	15.868	33.933	0.000	1207.562
Black	16.341	43.352	1.517	1017.932
Asian	12.227	18.319	3.034	291.271
Between Groups	49183.2		F-Score=11.781 *	
Within Groups	23199233.3			

* $p < 0.05$

Table 17. Descriptive Characteristics of Length of Stop by Driver Race/Ethnicity and Extended v. Non-Extended Stop

	Non-Extended Stops			
	Average	Standard Deviation	Minimum	Maximum
White	11.226	29.218	0.000	1019.449
Native American	12.085	11.188	3.034	80.403
Hispanic	12.624	26.172	0.000	1030.068
Black	14.034	42.285	1.517	1017.932
Asian	10.588	10.790	3.034	186.596
Overall	11.736	29.431	0.000	1030.068
	Extended Stops			
	Average	Standard Deviation	Minimum	Maximum
White	29.179	40.411	0.000	400.498
Native American	35.624	33.831	6.068	122.880
Hispanic	35.995	59.828	0.000	1207.562
Black	36.929	47.283	3.034	432.356
Asian	23.598	41.616	4.551	291.271
Overall	31.806	47.822	0.000	1207.562

We now examine the length of stop by race for non-extended and extended stops as seen in Table 17. Remember that extended stops are those stops where the deputy designates that the stop was longer due to a vehicle tow, a DUI, a language barrier, a training deputy, or a technical issue. Conversely, non-

extended stops are those where the deputies do not report the stop being extended for any of the above. For non-extended stops, the average length of stop for White drivers was 11.23 minutes, and for Hispanic drivers was 12.62 minutes. Conversely, the average length of an extended stop for White drivers was 29.18 minutes, and for Hispanic drivers was 35.99 minutes.

We now look specifically at differences between Hispanic and non-Hispanic drivers for non-extended stops as seen in Table 18. For non-extended stops, non-Hispanic drivers are stopped, on average, for 11.5 minutes, while Hispanic drivers are stopped for 12.6 minutes. An F-test indicates the differences between the two groups are significantly different from each other at the 0.05 level, and we can reasonably conclude that the average length of stops for Hispanic drivers is longer than for non-Hispanic drivers during non-extended stops.

Table 18. The Relationship between Hispanic Drivers and Length of Stop for Non-Extended Stops

	Average	Standard Deviation	Minimum	Maximum
Non-Hispanic	11.494	30.257	0	1019.449
Hispanic	12.624	26.172	0	1030.068
Between Groups	4306.369		F-score = 4.973 *	
Within Groups	17312194.360			

*p < 0.05

As shown in Table 19, the average length of extended stops for non-Hispanic drivers is about 29.9 minutes, compared with 36.0 minutes for Hispanic drivers. An F-test indicates that the differences between the two groups are statistically significant, and we can reasonably conclude that Hispanic drivers are subjected to extended stops that are, on average, longer than extended stops for non-Hispanic drivers. This finding should not, however, be over-interpreted. There are several additional factors, such as language barriers between the deputy and the driver that can influence the length of the stop. A more complex analysis that accounts for some of these additional factors is presented in the coming sections.

Table 19. Relationship between Length of Stop and Hispanic Drivers for Extended Stops

	Average	Standard Deviation	Minimum	Maximum
Non-Hispanic	29.934	41.229	0	432.356
Hispanic	35.995	59.828	0	1207.562
Between Groups	17564.981		F-score = 7.703 *	
Within Groups	5102982.790			

* p-value < 0.05

6. Internal Benchmarking with Inferential Statistics

In this section, we present more complex methods of internal benchmarking using multivariate statistical modeling. More specifically, we used hierarchical linear and non-linear modeling with random effects to examine whether there are race/ethnicity differences in a variety of post-stop outcomes. The inferential statistical techniques – or statistics which use probability theory to estimate relationships – employed here have been previously used by leading statisticians and policing scholars to estimate the presence and extent of racially biased policing (Fagan et al., 2009; Gelman, Fagan and Kiss, 2012; Gelman, Kiss and Fagan, 2006; Tillyer and Engel, 2013; Tillyer, Klahm and Engel, 2012). The benefit of these analyses is that unlike the ratio and χ^2 analyses presented earlier, the hierarchical models control for various aspects of the stop that would generate racial differences in the stop outcome. Thus, by including control variables in the models, we can be more certain that when racial differences in post-stop outcomes do exist, they are capturing an effect that is independent of other competing factors that may also influence these outcomes.

These models are not without their limitations. The most pressing concern is omitted variable bias: have we controlled for all aspects of a stop that may generate racial differences in post-stop outcomes? What the models can control for is limited to the information at hand. There are several important considerations that impact the outcome of stops that could not be measured here, such as driver/suspect demeanor or aggressiveness, deputy assignment, and other situational aspects of the stop. Next, like the descriptive statistical analyses, these models are not able to address whether minorities were targeted for stops by the MCSO without including the deputy's exposure to minority drivers.[11] Finally, these inferential models are only informative about the patrol function of the MCSO and its deputies.

6.1 Methods

6.1.1 Data

As discussed earlier, the primary source of data in this report is the TraCS data, which contains information on one year of deputy-initiated traffic stops by deputies from July 1, 2016 through June 30, 2017. Through additional sources of data, we include information on the deputy's personal characteristics, length of time working at the MCSO, assignment to grant work or special assignments, as well as whether they received flags from previous years. Also used is the 1993 Arizona State Plane coordinate system,[12]

[11] This is the idea behind external benchmarking.

[12] Latitude and longitude coordinates were geocoded and subsequently matched to census blocks, block groups, and tracts, as well as administrative boundaries designated by the MCSO, such as beats and districts. Around March 2017, several changes were made by the GIS department to the district and beat boundaries. These changes included eliminating the PRK (Parks) District, creating an "on water" beat in District 5 (i.e., Lakes) and changing the boundaries of several other beats with the new boundary resulting in the beat changing districts. For consistency, we geocoded all stops to the new district boundaries. This

which enables all stops to be geocoded and mapped into the MCSO's administrative boundaries, such as beat or district.

6.1.2 Dependent Variables

To determine if racially biased policing is occurring within the patrol function of MCSO, we begin by examining if the race/ethnicity of the driver is related to post-stop outcomes independent of other stop, driver, deputy, and contextual factors. To do this, we examine several dependent variables representing post-stop outcomes.

The first dependent variable – arrest – measures whether the driver was arrested during the traffic stop. This variable includes the two types of arrests, specifically booked into jail or cited and released. If the person is booked into jail, he or she is physically arrested, transported, and processed into a secure jail facility until appearing before the initial appearance judge. If a person is cited and released, he or she is issued a citation with a court date and must sign the citation promising to appear on the date and time provided on the citation. Additionally, we construct a variable representing discretionary arrests. Discretionary arrests include all arrests that the deputy is not required, by law, to conduct. Here, deputies must issue an arrest when there is a warrant for the driver, the stop involves a DUI, or the driver is driving on a suspended license. To construct this variable, any stop that *did not* include an ARS code or written stop reason signaling that the stop contained a warrant, suspended license, or DUI was considered a discretionary arrest.

Next, we examine whether the driver was searched. After deputies make an arrest, they are required to search the arrestee and often the vehicle. As such, when examining searches, we also control for arrest. Additionally, we construct a variable showing whether the search was discretionary. For purposes of this report, discretionary searches include only consent searches, where the deputy asks the driver if they would consent to a search and subsequently the driver agrees to that search.

Another means of determining racial bias in traffic stops is by examining whether searches produce a seizure of any item, which may include, but is not limited to, licenses, license plates, drugs, drug paraphernalia, or stolen goods. If racially biased policing is present, one should see lower percentages, or in this case, a lower likelihood of minorities having items seized. This would suggest that they are unfairly targeted for searches.

Also, we examine the outcome of the stop. Here, we predict whether the stop resulted in a warning or a citation.[13] Should racially biased policing be present, minorities will be associated with a differential likelihood of the outcome.

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not only enables us to use consistent boundaries, but these boundaries will be used in future research in the years to come.

[13] Stops can sometimes end in something other than a citation or warning. An incidental contact occurs when the driver is released immediately after contact. This occasionally occurs under certain contexts, such as Amber Alerts. Here, for example, the deputy would stop a vehicle matching the description of the wanted vehicle. After contact, however, the deputy determines that this is not the vehicle in question and releases the driver. Additional circumstances include other situations when the deputy determines during the course of the stop that the alleged violation which was the basis for the stop did not occur. For example, a deputy only sees a driver in a vehicle driving in the HOV lane of the highway during the restricted hours.

Finally, we examine the length of the stop in minutes. We construct this by taking the difference between the end time of the stop and the start time of the stop. As seen previously in Figure 3, the majority of stops are shorter in length with a few stops that are extremely long. When variables are distributed this way (i.e., there are extreme cases that are far away from what is average), they create problems in statistical models. To avoid this, we log the length of stop (+1)[14] so that the length of stop variable is structured in a way that leads to fewer outliers.

6.1.3 Situational Variables

We control for several situational variables related to the likelihood of any of the above outcomes. In this section, we discuss the situational variables which are likely to impact the outcome or be associated with the driver's race/ethnicity. First, included in the analyses is the Number of Passengers, where 0 shows there were no passengers, and each one unit increase in the variable shows the number of additional occupants in the vehicle. Second, traffic stops, like crime in general, are related to seasons (Hipp et al. 2004). Here, we included dummy variables for fall (includes the months of September-November), winter (includes the months of December-February), and spring (includes the months of March-June), with the reference season being summer (includes the months of July-August). Therefore, we compare stops that occurred during the fall, the spring, and the winter seasons to stops that occur in the summer. Finally, if the vehicle had an Arizona license plate, it was given a 1 on the variable AZ License Plate.

There are several situational variables important to the outcomes that are not measured here. For instance, the reason(s) for the stop – whether a registration problem, moving violation, or equipment violation – may impact the likelihood of certain stop outcomes. One study finds that stops related to outdated registrations and moving violations are less likely to evolve into arrests and searches (Schafer et al. 2006). Another study from the Midwest shows that moving violations, equipment violations and registration problems are more like to result in a warning than a citation, but only moving violations increased the likelihood of arrest (Tillyer and Engel 2013). While information on these types of situational variables is captured by the data, how that information is captured precludes them from being taken into consideration here given that deputies write down this information in an open field. A future analysis goal is to code this information so that it can be including future analyses.

6.1.4 Driver Variables

Several driver characteristics were also included in the analysis. Most pertinent to this analysis is the driver's race/ethnicity. Driver's race/ethnicity is based on the perceived race or ethnicity recorded on the TRaCS form by the deputy. We included a set of variables showing the driver was Native American, Asian, Black, or Hispanic, with White being the comparison category. Next, age is measured in years. Age is included in this analysis given research showing that some drivers are less likely to receive certain stop outcomes – like citations – when they are younger (Rosenfeld, Rojek and Decker 2011; Tillyer and Engel 2013). Lastly, we include a dummy variable showing that the driver was Male. Research shows that men

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The deputy-initiates a traffic stop and upon walking up to the vehicle now sees a child in the back seat. There is no HOV lane violation and the deputy would complete the incidental contact form and release the driver without a warning/citation/long form.

[14] The log of 0 cannot be taken. When variables contain 0, like length of stop does, the standard practice is to add a constant to all data points so that a log can be constructed.

are more likely to be pulled over and commit crime in general (Lundman and Kaufman 2003; Weitzer and Tuch 2004; Weitzer and Tuch 2002).

There are several driver characteristics that are not included in the models which could potentially impact the results. First, we are unable to control for suspect/driver demeanor. Scholars have demonstrated that drivers/suspects who are aggressive or disrespectful experience more negative stop-related outcomes (i.e., increased likelihood of a citation, arrest, and use of force) (Engel 2003; Engel, Sobol and Worden 2000; Garner, Maxwell and Heraux 2002; Worden, McLean and Wheeler 2012). Next, information on the driver's primary language may also be useful in understanding deputy-driver interactions (Herbst and Walker 2001; Reitzel, Rice and Piquero 2004; Skogan 2009); the length of stop analyses in forthcoming sections demonstrate that when deputies experience a language barrier, the traffic stop is longer than stops where deputies do not experience language barriers.

6.1.5 Deputy Variables

Deputy-specific variables begin with the deputy's length of employment at the MCSO.[15] Next, there is ample evidence that officers of different races police differently (Anwar and Fang 2006; Brown and Frank 2006; Close and Mason 2006; Close and Mason 2007; see Kochel, Wilson and Mastrofski 2011 for a summary of these effects for arrest). One study shows that while minority officers (e.g., Black and Latino officers) were less likely to search drivers, though when they did, they typically had higher "hit" rates than White officers (e.g., Close and Mason 2007; Dharmapala and Ross 2004; Persico and Todd 2005, 2008). As such, we include a series of variables indicating the race/ethnicity of the deputy as either Hispanic or Other Race; we compare these deputies to White deputies. Deputies who fall into the other race category include deputies who are Native American, Black, or Asian.[16] Gender of the officer is also shown to have a differentiating impact on police behavior (for example, see Paoline and Terrill 2005; Rabe-Hemp 2008). However female deputies only make up 4.6% of all deputies in this data. Thus, controlling for male-female difference in the outcomes is difficult given the lack of statistical power and is therefore not included in these analyses.

For several of the models, we introduce indicators for deputies related to the results of previous reports. FY2014-15 Flag is a variable that indicates whether the deputy received at least one flag from the ratio analysis conducted in the 2014-15 Yearly Report. FY2015-16 Flag is a variable that indicates whether the deputy received at least one flag from the ratio analysis conducted in the 2015-16 Yearly Report.

Finally, we constructed a series of indicator variables for stops that occurred while the deputy was on specialty assignment. The MCSO provided the name, serial number, and dates for which deputies were assigned to four special assignment task forces. Four dummy variables were created which indicated that a deputy conducted a stop while on assignment to one of the following specialty assignments. Click It or Ticket indicates a deputy-initiated stop that occurred on a day during which the officer was assigned to the

[15] To calculate how long a deputy has been employed with the MCSO, we subtracted the hire date of the deputy from the date of the stop, then rounded the difference to the nearest year. Note that this variable refers to the deputy's hire date at the MCSO, not the date the individual became sworn as a deputy. The sworn date data is currently incomplete and would not have been a viable addition to the models.

[16] In this data, stops conducted by minority deputies – with the exception of Hispanic deputies – are rare. For instance, stops made by Native American deputies make up less than 1% of all stops. Thus, controlling for differences between minority deputies and White deputies in the outcomes is difficult given the lack of statistical power. We collapse non-Hispanic minority deputies into a single indicator – Other Race.

seatbelt enforcement specialty patrol. DUI indicates a stop that occurred on a day the officer was assigned to the drunk driving task force. Aggressive Driver indicates a stop that occurred on a day the officer was assigned to the aggressive driving patrol. Work Zone Enforcement indicates a stop by a deputy who was assigned to a specialty patrol for work zones on the day of the stop.

There are other deputy characteristics that are not included in these analyses due to data restrictions. First, past research has found that officer level of education is predictive of certain outcomes, such as use of force (Rydberg and Terrill 2010). Next, like driver's native language, whether the officer is bilingual may also explain differences in certain outcomes, like the length of stop (Herbst and Walker 2001; Reitzel, Rice and Piquero 2004; Skogan 2009). These variables are not currently captured for all deputies who serve in the patrol function of the MCSO.

6.1.6 Contextual Variables

Policing varies across context (Fagan and Davies 2000; Kane 2002; Klinger 1997; Smith, 1986), and stops within the MCSO are no exception. Given the variability in the terrain and types of areas where the MCSO engages in law enforcement activities, it is imperative to control for contextual factors of stops. Here, we include variables to control for the district that a stop occurs in: Districts 1 through 4, Lakes, 6 and 7. District 1 is the reference category.[17]

6.2 General Analysis Plan

Traffic stops are not completely independent events; certain traffic stops may share deputies or a location. This lack of independence complicates analyses. Put another way, traffic stops in District A are more similar to each other than they are to traffic stops in District B. More importantly for this analysis, traffic stops for Deputy A are more similar to each other than they are to the stops Deputy B conducts. This relationship is especially salient to the data analyzed here: all deputies have their own unique reasons for conducting a deputy-initiated stop; this makes all the stops conducted by one deputy correlated with each other. Statisticians refer to this issue as "dependence in the data" and it needs to be addressed somehow in the multivariate models that we estimate here (Bryk & Raudenbush, 2002; Snijders & Bosker, 2012). Put differently, our analyses must adjust for the interdependence between stops conducted by the same deputy. We address this issue by using hierarchical linear or hierarchical generalized linear models. This approach accounts for the clustering of stop characteristics by deputy.[18, 19]

[17] Any district could have been chosen as the reference category; District 1 is not being singled out as more different than other districts.

[18] This data can be clustered in a number of ways: stops nested in deputies, beats, districts, or census tracts. Given the research questions here, nesting within deputies serves the purpose of answering these research questions the best.

[19] An alternative way to model this data is to conduct a fixed effects model. Fixed effect models, in this setting, would be excellent at controlling for who (i.e., deputy) conducts the stop; this would enable us to interpret the findings as something that is non-deputy specific. Fixed effects models are particularly good for identifying racial bias within organizations. Given that we want to identify which deputies, if any, are causing issues with racially biased policing, hierarchical linear models allow us to do that more effectively. That said, fixed effect versions of the upcoming models have been run and results stay generally the same.

The following analyses are based on hierarchical linear or hierarchical generalized linear models with stops nested within deputies. Below we present the general structure of the models. The level one equation is represented as:

$$\Lambda(\Pr Y_{ij} = 1) = \beta_0 + \beta_1 S_j + \beta_2 D_j + \beta_3 Dep_j + \beta_4 T_j$$

Where Λ is the logit function, $\Pr$ represents the probability of Y_{ij} , which is the outcome (e.g., arrest, search, seizure, citation) for stop *i* nested in unit *j*, β_0 represents the random intercept across time, S_j is a matrix of the stop characteristics with effects captured in a β_1 vector, D_j is a matrix of the driver-specific variables with effects captured in a β_2 vector, Dep_j is a matrix of the deputy characteristics with effects captured in a β_3 vector, and T_j is the matrix of the time and seasonal variables with their effects captured in β_4. The level two equation for the length of stop outcome is shown as:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

Where β_{0j} is the mean length of stop for the *j*th unit, γ_{00} represents the grand mean length of stop for the traffic enforcement portion of the MCSO, and u_{0j} is the random effect associated with unit *j*, which has a mean of zero and a variance of τ_{00}.

When modeling length of stop, the equations above would remain the same, with the exception of the outcome being structured as linear (simply represented as Y_{ij}) without the logistic function.

6.3 Results: Examining the Effect of Driver Race/Ethnicity on the Post-Stop Outcomes of Arrest, Search and Seizure for the Full Data Year

We begin with the results for the arrest model shown in Table 20. Of the situational characteristics, two seasonal variables were statistically significant. The results indicate that odds of arrest were 31.8% lower in winter and 17.8% lower in the fall compared to the summer. The results also suggest that stops occurring between 12:00 a.m. and 5:59 a.m. were associated with a 72.7% higher odds of an arrest compared to 6:00 a.m. to 8:59 p.m. The relationship between the number of passengers in the vehicle and the likelihood of arrest is also significant, with the odds of arrest increasing by 9.7% for each additional passenger in the car.

Next, all of the driver characteristics were statistically significant when predicting arrest. Using White drivers as the reference category, the odds of Native American drivers being arrested were 141.7% higher than Whites, the odds of Black drivers being arrested were 91.4% higher than Whites, the odds of Hispanic drivers being arrested were 68.8% higher than Whites, and the odds of Asian drivers being arrested were 52.0% lower than Whites. The odds of males being arrested were 47.8% higher than females. Further, for each additional year of age, drivers are significantly less likely to be arrested.

Among the deputy characteristics, ethnicity predicted changes in the odds of arrest. Hispanic deputies had 40.9% lower odds of arresting the driver compared to White deputies. Finally, for the contextual characteristics, stops in District 6 had 32.8% lower odds of an arrest compared to District 1. Stops in District 7 had 38.3% lower odds of an arrest compared to District 1. Stops in the Lake District had 51.3% lower odds of an arrest compared to District 1.

The results for the search outcome (also Table 20) are similar, but it is important to note that since arrest was included in the model, the results for the other variables are net of arrest. Arrest itself increased

Table 20. Random Effect Hierarchical Models Predicting Arrest, Search, and Seizure

	Arrest		Search		Seizure	
	B	Odds	B	Odds	B	Odds
Situational Characteristics:						
Driver Was Arrested			5.132*	169.325*	3.040*	20.896*
			(0.140)		(0.096)	
Number of Passenger in vehicle	0.092*	1.097*	-0.142*	0.867*	-0.016	0.985
	(0.030)		(0.058)		(0.044)	
Stop occurs between 12am to 5:59am	0.546*	1.727*	0.242	1.274	-0.172	0.842
	(0.093)		(0.166)		(0.139)	
Stop occurs between 9pm and 11:59pm	0.155	1.168	0.291	1.338	-0.083	0.921
	(0.089)		(0.156)		(0.124)	
Stop occurs in the fall	-0.196*	0.822*	0.025	1.025	0.234*	1.264*
	(0.085)		(0.163)		(0.117)	
Stop occurs in the winter	-0.383*	0.682*	0.442*	1.556*	0.325*	1.384*
	(0.089)		(0.161)		(0.119)	
Stop occurs in the spring	-0.146	0.864	0.194	1.214	-0.758*	0.469*
	(0.086)		(0.161)		(0.145)	
Vehicle has AZ licence plate	0.122	1.130	-0.040	0.961	0.947*	2.579*
	(0.117)		(0.210)		(0.218)	
Driver Characteristics:						
Driver is Native American	0.883*	2.417*	0.289	1.335	0.774*	2.169*
	(0.222)		(0.439)		(0.291)	
Driver is Asian	-0.734*	0.480*	0.258	1.294	0.348	1.416
	(0.301)		(0.443)		(0.279)	
Driver is Black	0.649*	1.914*	0.311	1.365	0.521*	1.683*
	(0.098)		(0.186)		(0.132)	
Driver is Hispanic	0.524*	1.688*	0.347*	1.414*	0.198	1.219
	(0.071)		(0.132)		(0.102)	
Driver is male	0.390*	1.478*	0.926*	2.523*	-0.020	0.980
	(0.066)		(0.134)		(0.087)	
Driver's age in years	-0.016*	0.984*	-0.007	0.993	-0.010*	0.990*
	(0.002)		(0.004)		(0.003)	
Deputy Characteristics:						
Length of employment at MCSO	-0.000	1.000	-0.029*	0.971*	-0.038*	0.962*
	(0.010)		(0.015)		(0.013)	
Deputy is Hispanic	-0.525*	0.591*	0.138	1.148	0.005	1.005
	(0.190)		(0.267)		(0.239)	
Deputy is Other Race	-0.235	0.791	0.069	1.071	-0.062	0.940
	(0.330)		(0.481)		(0.447)	
Rank is Deputy	-0.513*	0.599*	-0.501	0.606	-0.449	0.638
	(0.253)		(0.372)		(0.338)	
Contextual Characteristics:						
District 2	-0.270	0.764	-0.421	0.656	-0.837*	0.433*
	(0.149)		(0.249)		(0.218)	
District 3	-0.007	0.993	-0.157	0.854	-0.116	0.891
	(0.147)		(0.243)		(0.192)	
District 4	-0.158	0.854	-0.108	0.898	-0.594*	0.552*
	(0.166)		(0.267)		(0.239)	
District 6	-0.397*	0.672*	0.107	1.113	-0.949*	0.387*
	(0.178)		(0.299)		(0.328)	
District 7	-0.483*	0.617*	-0.786*	0.455*	-0.240	0.787
	(0.156)		(0.294)		(0.205)	
Lake District	-0.721*	0.487*	-0.599	0.549	-0.822*	0.439*
	(0.249)		(0.379)		(0.323)	
Constant	-2.577*	0.076*	-5.461*	0.004*	-4.090*	0.017*
	(0.330)		(0.527)		(0.468)	
Observations	22,233		22,233		22,233	
Number of groups	338		338		338	

Standard errors in parentheses

* p<0.05

the odds of a search by almost seventeen thousand percent. Stops occurring in the winter had an increase in the odds of a search of 55.6%. For each additional passenger in the car, the odds of search decreased by 13.3%. As far as driver characteristics, Hispanic drivers had 41.4% higher odds of search than Whites. The odds of males being searched were 152.3% higher than those for females. Among the deputy characteristics, the odds of search decreased by 2.9% for every year a deputy has been in the department. Of the contextual characteristics, District 7 had odds of search 54.5% lower than the reference district.

Finally, we examine the likelihood of seizures during a stop (also in Table 20). Given that all arrests require a search, arrest was associated with a 1989.6% increase in the odds of seizure. Compared to White drivers, the odds of seizure increased 116.9% if the driver was Native American and increased 68.3% if the driver was Black. There was no significant relationship between Hispanic drivers and the odds of seizure during a search. Male drivers did not have significantly different odds than female drivers of having items seized. With each additional year of driver age, the likelihood of seizure for drivers decreased 1.0%. There were no significant differences in the odds of seizure if the deputy was Hispanic or was of a different minority race/ethnicity, both compared to White deputies. For contextual characteristics, the odds of seizure, relative to District 1, was 56.7% lower in District 2, 44.8% lower in District 4, 56.1% lower in Lakes District and 61.3% lower in District 6.These models shed light on the answer to research question 2, which asks: "In the fiscal year of 2016-2017, are there racial/ethnic differences in post-stop outcomes within the patrol function of the MCSO?" In brief, we conclude that yes, there are racial differences in the post-stop outcomes of arrest, search, and seizure. We can gain certain insights when considering the search and seizure results together. Hispanic drivers are more likely to be arrested and more likely to be searched. At the same time, they are no more or less likely to have items seized.

6.3.1 Results: Examining the Effect of Driver Race/Ethnicity on the Discretionary Post-Stop Outcomes of Arrest and Search

In Table 21, we examine whether racial/ethnic differences exist when predicting the likelihood of discretionary arrests and searches, net of controls. First, remember that discretionary arrests include only those arrests that do not involve a warrant, a suspended license, or a DUI. Also, discretionary searches only include searches where the deputy asks the driver to consent to a search and the driver agrees.

Beginning with discretionary arrests, in terms of driver characteristics, Native American drivers have a much higher likelihood of experiencing arrest relative to Blacks and Hispanics. While all three racial groups are significantly more likely to be arrested compared to White drivers, Native Americans are 112% percent more likely to experience this as compared to Hispanics (29.1 % relative to Whites) and Blacks (41.7% relative to Whites).

As for discretionary (i.e., consent) searches, Hispanics are the only minorities to have a significantly higher likelihood of being subjected to a consent search: Hispanic drivers are nearly 3 times (2.9) more likely than Whites to experience a consent search. Males are nearly 6.7 times more likely to undergo consent searches than females. There is also a strong association between consent searches and arrests: all arrested drivers are nearly 30 times more likely to have undergone a consent search. There is also a seasonality to consent searches: consent searches are more likely to occur in the winter and spring months than in the summer or fall months. Lastly, when the stop occurs in District 2, there is a reduced likelihood of a consent search.

Table 21. Hierarchical Logistic Models for Discretionary Arrests and Searches - All 2016/17 Data

	Arrest		Search	
	B	Odds	B	Odds
Situational Characteristics:				
Driver Was Arrested			3.385*	29.528*
			(0.44)	
Number of Passenger in vehicle	0.028	1.029	-0.205	0.815
	(0.049)		(0.26)	
Stop occurs between 12am to 5:59am	0.459*	1.582*	-0.152	0.859
	(0.147)		(0.67)	
Stop occurs between 9pm and 11:59pm	0.028	1.029	0.096	1.1
	(0.143)		(0.59)	
Stop occurs in the fall	-0.301*	0.740*		
	(0.134)			
Stop occurs in the winter	-0.579*	0.560*	1.896*	6.657*
	(0.141)		(0.79)	
Stop occurs in the spring	-0.242	0.785	1.963*	7.121*
	(0.135)		(0.79)	
Vehicle has AZ licence plate	-0.211	0.810	-0.464	0.629
	(0.160)		(0.77)	
Driver Characteristics:				
Driver is Native American	0.752*	2.122*	1.847	6.339
	(0.366)		(1.15)	
Driver is Asian	-0.602	0.548	-	-
	(0.426)		-	
Driver is Black	0.348*	1.417*	1.172	3.227
	(0.162)		(0.66)	
Driver is Hispanic	0.256*	1.291*	1.080*	2.946*
	(0.113)		(0.52)	
Driver is male	0.598*	1.819*	1.903*	6.707*
	(0.111)		-0.753	
Driver's age in years	-0.032*	0.968*	(0.01)	0.988
	(0.004)		-0.017	
Deputy Characteristics:				
Length of employment at MCSO	0.036*	1.037*	-0.048	0.953
	(0.014)		(0.04)	
Deputy is Hispanic	-0.790*	0.454*	0.886	2.424
	(0.270)		(0.53)	
Deputy is Other Race	-0.275	0.760	0.901	2.463
	(0.450)		(0.82)	
Rank is Deputy	-0.433	0.648	-	-
	(0.337)		-	
Contextual Characteristics:				
District 2	0.200	1.221	-1.370*	0.254*
	(0.213)		-0.666	
District 3	0.345	1.413	(0.58)	0.563
	(0.215)		-0.614	
District 4	0.173	1.188	(0.64)	0.529
	(0.233)		-0.849	
District 6	-1.014*	0.363*	(1.44)	0.237
	(0.290)		-0.824	
District 7	-0.685	0.504	-	-
	(0.365)		-	
Lake District	-0.561*	0.571*	0.391	1.479
	(0.261)		(0.91)	
Constant	-3.550*	0.029*	-7.815*	0.000*
	(0.459)	(0.013)	(1.582)	(0.001)
Observations	22,233		13,333	
Number of groups	338		277	

Standard errors in parentheses

* p<0.05

Table 22. Random Effect Hierarchical Models Predicting Citations (Reference is Warning)

	B	Odds
Situational Characteristics:		
Number of Passenger in vehicle	-0.053*	0.948*
	(0.018)	
Stop occurs between 12am to 5:59am	-0.495*	0.610*
	(0.060)	
Stop occurs between 9pm and 11:59pm	-0.531*	0.588*
	(0.052)	
Stop occurs in the fall	-0.129*	0.879*
	(0.048)	
Stop occurs in the winter	-0.060	0.941
	(0.048)	
Stop occurs in the spring	0.010	1.010
	(0.049)	
Vehicle has AZ licence plate	0.099	1.104
	(0.057)	
Driver Characteristics:		
Driver is Native American	0.131	1.140
	(0.166)	
Driver is Asian	0.117	1.124
	(0.105)	
Driver is Black	0.021	1.021
	(0.062)	
Driver is Hispanic	0.149*	1.160*
	(0.042)	
Driver is male	-0.027	0.973
	(0.033)	
Driver's age in years	-0.017*	0.983*
	(0.001)	
Deputy Characteristics:		
Length of employment at MCSO	0.023*	1.023*
	(0.010)	
Deputy is Other Race	-0.360	0.697
	(0.184)	
Deputy is Hispanic	-0.254	0.776
	(0.321)	
Rank is Deputy	0.062	1.064
	(0.251)	
Contextual Characteristics:		
District 2	0.139	1.150
	(0.114)	
District 3	0.406*	1.501*
	(0.111)	
District 4	0.195	1.216
	(0.119)	
District 6	0.032	1.033
	(0.102)	
District 7	1.314*	3.720*
	(0.194)	
Lake District	0.470*	1.599*
	(0.123)	
Constant	-0.172	0.842
	(0.298)	
Observations	20,806	20,806
Number of groups	334	334

Standard errors in parentheses

* p<0.05

Table 23. Random Effect Hierarchical Models Predicting the Logged Length of Stop

	B	SE
Situational Characteristics:		
Number of passengers in vehicle	0.010*	(0.003)
Stop occurs between 6am - 8:59pm	0.046*	(0.010)
Stop occurs between 9pm - 11:59pm	0.045*	(0.009)
Stop occurs in the fall	-0.002	(0.008)
Stop occurs in the winter	-0.045*	(0.008)
Stop occurs in the spring	-0.057*	(0.008)
Vehicle has AZ licence plate	-0.167*	(0.010)
Driver was arrested	0.659*	(0.015)
Vehicle was searched	0.724*	(0.020)
Technical problems encountered during stop	0.245*	(0.012)
Stop involves DUI	0.447*	(0.022)
Stop involves tow	0.851*	(0.019)
Stop involves deputy training	0.168*	(0.038)
Language barrier	0.254*	(0.028)
Driver Characteristics:		
Driver is Native American	0.037	(0.026)
Driver is Asian	0.030	(0.018)
Driver is Black	0.057*	(0.010)
Driver is Hispanic	0.065*	(0.007)
Driver is male	0.004	(0.005)
Driver's age in years	-0.001*	(0.000)
Deputy Characteristics:		
Length of employment at MCSO	0.008*	(0.002)
Deputy is Hispanic	0.058*	(0.027)
Deputy is Other Race	-0.050	(0.046)
Rank is Deputy	-0.048	(0.037)
Contextual Characteristics:		
District 2	-0.080*	(0.018)
District 3	-0.010	(0.018)
District 4	0.038*	(0.019)
District 6	0.020	(0.019)
District 7	-0.039*	(0.016)
Lake District	0.037	(0.027)
Constant	2.520*	(0.044)
Observations	22,233	
Number of groups	338	

Standard errors in parentheses

* p<0.05

These models sought to understand the following research question: "When examining fully discretionary outcomes pertaining to certain types of searches, citations, and arrests, do differences in these outcomes by race/ethnicity remain?" In these two models we see that minorities have an increased likelihood of experiencing these two outcomes. Specifically, both Hispanics and Blacks are more likely to experience discretionary arrests net of controls and Hispanics are more likely to experience discretionary searches, net of controls.

6.4 Results: Examining the Effect of Driver Race/Ethnicity on the Likelihood of Citations

Citations and warnings are the most common stop outcomes, with warnings accounting for 43.4% of all stops in the data, and citations accounting for 55.9% of all stops over the year. The outcome in this analysis is coded so that 0 represents stops that result in a warning, and 1 represents stops that result in a citation. Citations associated with arrest were removed from the analysis. Using a hierarchical logistic model, this analysis estimates differences in the probability of receiving a citation over receiving a warning, shown in Table 22. This analysis utilizes the same variables as the models predicting arrest, search, and seizure, including situational characteristics, driver characteristics, deputy characteristics, and contextual characteristics, limits the outcome to warnings v. citations that are not associated with arrests.[20]

Among the situational characteristics, the number of passengers was statistically significant. The odds of receiving a citation decreased by 5.2% for every passenger in the car. Among driver characteristics, age and being Hispanic predicted the likelihood of receiving a citation over a warning. Older drivers' odds of receiving a citation were 1.7% lower for additional year of age. Hispanic drivers had 16.0% higher odds of receiving a citation over a warning compared to White drivers. Length of employment at the MCSO significantly predicted the likelihood of giving a citation rather than a warning. Odds of giving a citation increased 2.3% with each one-year increase in tenure. No other deputy characteristics were related to the likelihood of giving a citation over a warning. Relative to District 1, the odds of receiving a citation instead of a warning were 50.1% higher in District 3, 59.9% higher in the Lake District, and 272.0% higher in District 7.

6.5 Results: Examining the Effect of Driver Race/Ethnicity on the Length of Stop

Remember that in the descriptive analysis section, we showed that race/ethnicity and length of stop were not independent of each other. To further understand the relationship between driver characteristics and stop length, we next turn to a hierarchical linear regression analysis of length of stop (Table 23). This model includes variables for situational characteristics, driver characteristics, deputy characteristics, and contextual characteristics. Additionally, in the length of stop models, we control for the different types of ways that a stop could be extended: technical problems, language barriers, stops involving training, tows and DUIs. We also include arrest and search as other ways that can lengthen the stop time as controls.

[20] Also note that stops which result in incidental contacts or field interview cards are excluded so that we could purely compare citations and warnings.

Of the situational characteristics, only stops that occurred in the fall were not significantly different in length of stop than those stops that occurred in the summer. Each additional passenger increased the length of stop by 1%, stops involving arrest were 65.9% longer, and those involving searches were 72.4% longer. Technical problems, stops involving towing, DUI stops, deputy training, and language barriers all increased the length of stop. The length of stop was shorter in situations when the vehicle had an Arizona license plate compared to vehicles with a non-Arizona license plate. Stops occurring in the winter or the spring were shorter compared to stops during the summer. Additionally, stops occurring between 6:00 a.m. and 8:59 p.m., and between 9:00 p.m. and 11:59 p.m. are longer.

Black drivers' stops were 5.7% longer than White drivers' stops, and Hispanic drivers were stopped 6.5% longer than White drivers. No other racial minorities had significantly different stop times compared to White drivers. Male drivers did not have significantly longer stops than female drivers, all else equal. Older drivers experienced shorter stops, but the effect was very small.

Among deputy characteristics, length of employment at the MCSO was associated with a .8% increase in length of stop for every year of the deputy's tenure. Also, the length of stop is 5.8% longer for Hispanic deputies compared to White deputies. Relative to District 1, stops were 3.8% longer in District 4, 3.9% shorter in District 7, and 8% shorter in District 2.

6.6 Results: Estimating the Effects of Having Prior Flags on Post-Stop Outcomes by Race/Ethnicity

We aim to ascertain whether deputies who have been identified as engaging in potentially problematic behavior since 2014 are responsible for the differential race/ethnicity effects for arrest, search, seizure, citation and length of stop. To do this, we include a model with a variable signaling whether the deputy had a flag in the reporting year of 2014-2015 or 2015-2016.

*Table 24. Descriptive Statistics of Deputies with Flags in Previous Report Years**

	Report Year 14-15	Report Year 15-16
% of Deputies with 1+ Flags	88%	88.30%
Average Number of Flags	3.427	4.577
Total Number of Deputies with Flags	235	288

*Note these statistics apply to the deputies in this annual report who were also in the reports from years prior.

In Table 24, we provide the descriptive statistics for deputies with flags in the previous report years. In reporting year 2014-2015, 88% of deputies who conducted deputy-initiated stops were flagged. In reporting year 2015-2016, 88.3% of deputies were flagged. Keep in mind that while flags indicate that a deputy may be engaged in problematic behavior, two things need to happen before a formal alert is set. First, the flag needs to be generated based on a suitable number of stops. Ratios are very sensitive to low numbers of stops, which increases the likelihood of false positives. Next, because false positives are common and there may be plausible reasons for the stop behavior in question, supervisors review the flags

Table 25. Random Effect Hierarchical Logistic Models Predicting Arrest and Search with Prior Flags

	Arrest				Search			
	Model 1		Model 2		Model 1		Model 2	
	B	Odds	B	Odds	B	Odds	B	Odds
Previous Flag 14-15	0.359*	1.432*	0.407*	1.503*	-0.155	0.856	-0.134	0.875
	(0.158)		(0.164)		(0.229)		(0.244)	
Previous Flag 15-16	0.390	1.476	0.311	1.364	-0.376	0.687	-0.061	0.940
	(0.234)		(0.246)		(0.327)		(0.364)	
Previous Flag 14-15 * Hispanic Driver	-	-	-0.164	0.849	-	-	-0.068	0.935
	-		(0.149)		-		(0.266)	
Previous Flag 15-16 * Hispanic Driver	-	-	0.306	1.358	-	-	-0.968*	0.380*
	-		(0.312)		-		(0.431)	
Situational Characteristics:								
Driver was arrested	-	-	-	-	5.143*	171.279*	5.162*	174.582*
	-		-		(0.140)		(0.141)	
Number of Passenger in vehicle	0.092*	1.096*	0.091*	1.096*	-0.140*	0.870*	-0.138*	0.871*
	(0.030)		(0.030)		(0.058)		(0.058)	
Stop occurs between 12am to 5:59am	0.545*	1.724*	0.546*	1.727*	0.246	1.279	0.247	1.280
	(0.093)		(0.093)		(0.166)		(0.166)	
Stop occurs between 9pm and 11:59pm	0.155	1.168	0.156	1.168	0.291	1.337	0.290	1.337
	(0.089)		(0.089)		(0.156)		(0.155)	
Stop occurs in the fall	-0.197*	0.821*	-0.197*	0.821*	0.032	1.032	0.036	1.037
	(0.085)		(0.085)		(0.163)		(0.163)	
Stop occurs in the winter	-0.385*	0.681*	-0.386*	0.680*	0.447*	1.563*	0.456*	1.578*
	(0.089)		(0.089)		(0.161)		(0.161)	
Stop occurs in the spring	-0.144	0.866	-0.145	0.865	0.195	1.216	0.197	1.217
	(0.086)		(0.086)		(0.161)		(0.161)	
Vehicle has AZ licence plate	0.126	1.134	0.127	1.135	-0.040	0.961	-0.049	0.952
	(0.117)		(0.117)		(0.210)		(0.211)	
Driver Characteristics:								
Driver is Native American	0.879*	2.408*	0.876*	2.402*	0.277	1.319	0.296	1.344
	(0.222)		(0.222)		(0.440)		(0.437)	
Driver is Asian	-0.733*	0.481*	-0.731*	0.482*	0.258	1.294	0.269	1.309
	(0.301)		(0.301)		(0.443)		(0.447)	
Driver is Black	0.649*	1.914*	0.648*	1.911*	0.308	1.360	0.303	1.353
	(0.098)		(0.098)		(0.186)		(0.186)	
Driver is Hispanic	0.524*	1.688*	0.350	1.419	0.343*	1.409*	1.271*	3.564*
	(0.070)		(0.299)		(0.132)		(0.399)	
Driver is male	0.389*	1.476*	0.390*	1.477*	0.927*	2.527*	0.934*	2.544*
	(0.066)		(0.066)		(0.134)		(0.134)	
Driver's age in years	-0.016*	0.984*	-0.016*	0.984*	-0.007	0.993	-0.007	0.993
	(0.002)		(0.002)		(0.004)		(0.004)	
Deputy Characteristics:								
Length of employment at MCSO	-0.007	0.993	-0.007	0.993	-0.025	0.976	-0.025	0.976
	(0.010)		(0.010)		(0.015)		(0.015)	
Deputy is Hispanic	-0.538*	0.584*	-0.542*	0.582*	0.141	1.152	0.136	1.146
	(0.185)		(0.185)		(0.265)		(0.266)	
Deputy is Other	-0.197	0.821	-0.197	0.821	0.047	1.048	0.032	1.032
	(0.323)		(0.323)		(0.478)		(0.482)	
Rank is Deputy	-0.541*	0.582*	-0.539*	0.583*	-0.462	0.630	-0.457	0.633
	(0.249)		(0.249)		(0.370)		(0.372)	
Contextual Characteristics:								
District 2	-0.317*	0.728*	-0.314*	0.731*	-0.394	0.674	-0.388	0.678
	(0.148)		(0.148)		(0.250)		(0.250)	
District 3	-0.007	0.993	-0.006	0.994	-0.166	0.847	-0.165	0.848
	(0.146)		(0.146)		(0.243)		(0.243)	
District 4	-0.157	0.855	-0.158	0.854	-0.128	0.880	-0.121	0.886
	(0.165)		(0.165)		(0.267)		(0.268)	
District 6	-0.477*	0.621*	-0.476*	0.621*	0.107	1.113	0.108	1.114
	(0.155)		(0.155)		(0.299)		(0.299)	
District 7	-0.713*	0.490*	-0.711*	0.491*	-0.785*	0.456*	-0.786*	0.456*
	(0.245)		(0.245)		(0.293)		(0.293)	
Lake District	-0.407*	0.666*	-0.404*	0.668*	-0.611	0.543	-0.610	0.543
	(0.177)		(0.177)		(0.377)		(0.379)	
Constant	-3.065*	0.047*	-3.029*	0.048*	-5.099*	0.006*	-5.421*	0.004*
	(0.376)		(0.382)		(0.578)		(0.601)	
Observations	22,233		22,233	22,233	22,233		22,233	
Number of groups	338		338	338	338		338	

Standard errors in parentheses

* p<0.05

Table 26. Random Effect Hierarchical Models Predicting Citations with Prior Flags

	Model 1		Model 2	
	B	Odds	B	Odds
Previous Flag- 14-15	0.285	1.330	0.284	1.329
	(0.159)		(0.160)	
Previous Flag- 15-16	0.406	1.500	0.359	1.432
	(0.215)		(0.217)	
Previous Flag- 14-15 * Hispanic			-0.005	0.995
			(0.086)	
Previous Flag- 15-16 * Hispanic			0.242	1.274
			(0.156)	
Situational Characteristics:				
Number of Passenger in vehicle	-0.053*	0.948*	-0.053*	0.948*
	(0.018)		(0.018)	
Stop occurs between 12am to 5:59am	-0.496*	0.609*	-0.495*	0.610*
	(0.060)		(0.060)	
Stop occurs between 9pm and 11:59pm	-0.532*	0.587*	-0.533*	0.587*
	(0.052)		(0.052)	
Stop occurs in the fall	-0.128*	0.880*	-0.128*	0.880*
	(0.048)		(0.048)	
Stop occurs in the winter	-0.061	0.941	-0.061	0.941
	(0.048)		(0.048)	
Stop occurs in the spring	0.011	1.011	0.010	1.010
	(0.049)		(0.049)	
Vehicle has AZ licence plate	0.100	1.105	0.100	1.105
	(0.057)		(0.057)	
Driver Characteristics:				
Driver is Native American	0.129	1.138	0.128	1.137
	(0.166)		(0.165)	
Driver is Asian	0.116	1.123	0.115	1.122
	(0.105)		(0.105)	
Driver is Black	0.021	1.021	0.020	1.021
	(0.062)		(0.062)	
Driver is Hispanic	0.149*	1.160*	-0.072	0.931
	(0.042)		(0.148)	
Driver is male	-0.027	0.973	-0.027	0.973
	(0.033)		(0.033)	
Driver's age in years	-0.017*	0.983*	-0.017*	0.983*
	(0.001)		(0.001)	
Deputy Characteristics:				
Length of employment at MCSO	0.018	1.019	0.018	1.019
	(0.010)		(0.010)	
Deputy is Hispanic	-0.395*	0.673*	-0.397*	0.672*
	(0.182)		(0.182)	
Deputy is Other	-0.214	0.808	-0.215	0.806
	(0.316)		(0.316)	
Rank is Deputy	0.032	1.032	0.036	1.037
	(0.247)		(0.247)	
Contextual Characteristics:				
District 2	0.118	1.125	0.119	1.127
	(0.114)		(0.114)	
District 3	0.399*	1.490*	0.400*	1.492*
	(0.111)		(0.111)	
District 4	0.195	1.215	0.194	1.214
	(0.119)		(0.119)	
District 6	0.039	1.040	0.466*	1.593*
	(0.101)		(0.123)	
District 7	1.322*	3.750*	0.039	1.040
	(0.192)		(0.101)	
Lake District	0.464*	1.591*	1.321*	3.746*
	(0.123)		(0.192)	
Constant	-0.639	0.528	-0.600	0.549
	(0.341)		(0.342)	
Observations	20,806		20,806	
Number of groups	334		334	

Standard errors in parentheses
* p<0.05

Table 27. Random Effect Hierarchical Models Predicting the Logged Length of Stop with Prior Flags

	Model 1		Model 2	
	B	SE	B	SE
Prior Flags Year 14/15	-0.026	(0.023)	-0.020	(0.023)
Prior Flags Year 15/16	-0.080*	(0.031)	-0.089*	(0.032)
Prior Flags Year 14/15 * Driver is Hispanic	-	-	-0.025	(0.014)
Prior Flags Year 15/16 * Driver is Hispanic	-	-	0.046	(0.026)
Situational Characteristics:				
Number of passengers in vehicle	0.011*	(0.003)	0.010*	(0.003)
Stop occurs between 12am - 5:59am	0.046*	(0.010)	0.046*	(0.010)
Stop occurs between 9pm - 11:59pm	0.045*	(0.009)	0.045*	(0.009)
Stop occurs in the fall	-0.002	(0.008)	-0.002	(0.008)
Stop occurs in the winter	-0.045*	(0.008)	-0.046*	(0.008)
Stop occurs in the spring	-0.058*	(0.008)	-0.058*	(0.008)
Vehicle has AZ licence plate	-0.167*	(0.010)	-0.167*	(0.010)
Driver was arrested	0.659*	(0.015)	0.659*	(0.015)
Vehicle was searched	0.723*	(0.020)	0.724*	(0.020)
Technical problems encountered during stop	0.246*	(0.012)	0.246*	(0.012)
Stop involves DUI	0.447*	(0.022)	0.446*	(0.022)
Stop involves tow	0.851*	(0.019)	0.851*	(0.019)
Stop involves deputy training	0.167*	(0.038)	0.166*	(0.038)
Language barrier	0.254*	(0.028)	0.254*	(0.028)
Driver Characteristics:				
Driver is Native American	0.037	(0.026)	0.037	(0.026)
Driver is Asian	0.030	(0.018)	0.030	(0.018)
Driver is Black	0.057*	(0.010)	0.057*	(0.010)
Driver is Hispanic	0.065*	(0.007)	0.040	(0.025)
Driver is male	0.004	(0.005)	0.004	(0.005)
Driver's age in years	-0.001*	(0.000)	-0.001*	(0.000)
Deputy Characteristics:				
Length of employment at MCSO	0.008*	(0.002)	0.008*	(0.002)
Deputy is Hispanic	0.063*	(0.026)	0.062*	(0.026)
Deputy is Other Race	-0.054	(0.046)	-0.054	(0.046)
Rank is Deputy	-0.042	(0.036)	-0.041	(0.036)
Contextual Characteristics:				
District 2	-0.076*	(0.018)	-0.076*	(0.018)
District 3	-0.010	(0.018)	-0.010	(0.018)
District 4	0.037*	(0.019)	0.036*	(0.019)
District 6	0.020	(0.019)	0.021	(0.019)
District 7	-0.040*	(0.016)	-0.041*	(0.016)
Lake District	0.036	(0.027)	0.036	(0.027)
Constant	2.596*	(0.050)	2.600*	(0.050)
Observations	22,233		22,233	
Number of groups	338		338	

Standard errors in parentheses

* p<0.05

prior to turning them into a formal alert. Thus, while these are high percentages, they should be interpreted with caution. Next, on average, deputies had 3.4 flags in reporting year 2014-2015 and 4.6 flags in reporting year 2015-2016.

We begin with the model for arrest, shown in Table 25. Model 1 shows the hierarchical logistic regression model predicting the likelihood of arrest with controls and variables signaling that the deputy conducting the stop received at least one flag in the 2014-2015 report or the 2015-2016 report. In Model 1, deputies with a flag in the 2014-2015 report are significantly more likely to issue an arrest than their counterparts; indeed, they are 1.4 times more likely to arrest than their counterparts. Moreover, the main effect of Hispanic drivers is significant and shows that Hispanics are 1.7 times more likely to be arrested than Whites. Model 2 includes the interactions between flags from the previous report year and Hispanic drivers. The interactions will help determine if deputies who received flags in prior reporting years are more likely to arrest Hispanic drivers. The interaction variables are not significant, showing that while deputies with flags from the 2014-2015 annual report are more likely to arrest drivers, they are not more likely to arrest Hispanic drivers. In fact, the coefficient for the interaction between Flags in the 14-15 Report and the Hispanic driver is negative, though not significant. Moreover, the main effect of Hispanic driver is not significant, suggesting that while there may not be statistically significant differences between deputies who received a flag in the 2014-2015 report, the deputies who did receive a flag do seem to account for some of the Hispanic driver differences in arrest.

Also included in Table 25 are models examining the effect of previous flags on search outcomes in the 2016-17 fiscal year. Unlike arrest, we see that stops made by deputies with flags from previous reports are not significantly different on the likelihood of search than stops made by deputies without flags from either prior report. However, we do see that deputies who have been flagged in the prior data year, 2015-2016, are significantly less likely to conduct searches of Hispanics.

Next, we conducted analyses which tested similar models for seizure; these do not show that the previous flag variables generated significant differences. As such, we refrain from showing these models here.

Shown in Table 26, we also conducted analyses which tested the effect of the deputies with flags in either the 2014-2015 or the 2015-2016 report on the likelihood of citations. In Model 1, deputies who received flags in either previous reporting year were not significantly different on citation in 2016-2017 than their non-flagged counterparts. The main effect of Hispanic drivers is significant and positive, showing that Hispanic drivers had 1.16 times higher odds of receiving a citation than White drivers. In Model 2, we see both interactions between flags from previous report years and Hispanic Driver are a non-significant. The main effect of Hispanic is not significant in Model 2. While there are not significant interactions, deputies with previous flags may be partially responsible for the difference between Hispanic and White drivers.

Finally, we examine the effects of prior flags during previous years on length of stop. These results are in Table 27. In Model 1, we find that deputies with a flag in reporting year 2015-2016 had, on average, 8.0% shorter stops than deputies who were not flagged in 2015-2016. The main effect of Hispanic drivers is significant and positive, showing that Hispanic drivers are subject to 6.5% longer stops. In Model 2 we include an interaction between the two previous flag variables and Hispanic drivers. While the interactions are not significant, the effect of deputies having a flag in 2015-2016 is significant. Also, we find that the main effect of being Hispanic on length of stop is no longer significant.

With these analyses, we seek to answer if deputies who were identified as engaging in potentially problematic behavior in previous reports were associated with the differential race/ethnicity effects for arrest, search, citation, and length of stop seen in the 2016-2017 data year. We find little evidence that this is the case; the exception being the likelihood of being searched for Hispanics, and in this case, Hispanics are less likely to be searched by deputies who previously had flags in the 2015-2016 reporting year.

6.7 Results: Estimating the Effects Traffic Enforcement Related Special Assignments on Post-Stop Outcomes by Race/Ethnicity

Next, we examine whether deputies assigned to additional traffic enforcement details that are special assignments or grant work impact differences in post-stop outcomes by race/ethnicity. The concern here is related to deputies' exposure to different types of drivers and reduced discretion given their assignment. It is possible that deputies on traffic enforcement specialty assignments or and grant work are exposed to a different set of drivers and have restricted discretion due to the needs of the grant work or assignment. Thus, if traffic enforcement details put deputies at risk for being identified engaging in problematic policing, then assignment to a traffic enforcement detail should be a consideration when weighing when to initiate a supervisory discussion for a deputy. Conversely, if the likelihood of post-stop outcomes by race/ethnicity are not impacted by deputies' assignment to traffic enforcement details, then these assignments can be ruled out as contributors to a deputy's problematic policing behavior.

We begin by estimating the effects of the four different types of specialty assignments/grant work: work zone enforcement, aggressive driving, DUI task force and Click It or Ticket. Should these variables be significant, it would demonstrate that the assignment of deputies to traffic enforcement related specialty assignments/grant work impacts the likelihood of various post-stop outcomes. Next, we interact the types of special assignment/grant work variables and the Hispanic driver variable. A significant interaction signals that Hispanic drivers are more likely to experience a particular outcome when the deputy initiating contact is on special assignment/grant work. Lastly, in this section, when interpreting the results, we restrict our discussion to the variables of interest: the specialty assignment/grant work variables, Hispanic driver and their interactions.

Beginning with Table 28, or the models examining arrest and specialty assignments, we see that the effect of the Hispanic driver is significant and positive; the odds ratio for Hispanic drivers is 1.69, meaning Hispanics are 1.69 times more likely to be arrested than Whites. In Model 1, there are no significant effects of specialty assignments on the outcome of arrest; put simply, deputy behavior during specialty assignments does not generate a differential likelihood of arrest. Stops conducted by deputies assigned to the aggressive driving task force are less likely to produce an arrest over all. In Model 2, the interactions between Hispanic driver and the specialty assignment/grant work variables are included; no interaction is significant. Further, the Hispanic driver variable remains significant in Model 2, suggesting that specialty assignment does not produce differential arrest likelihoods in general (no significant effects) or for Hispanic drivers (no significant interactions and the Hispanic variable is still significant).

Table 29 displays the results for the outcome of citation. In Model 1, all of the specialty assignment variables are significant. Deputies are 2.1 times more likely to issue citations over warnings when on work zone enforcement, 1.9 times more likely on aggressive driving assignment, 2.6 times more likely on Click It or Ticket assignment, but 63% less likely when on DUI Task Force assignment. In Model 2 the interactions between the specialty assignment/grant work variables and Hispanic drivers are included, though none of them are significant. The main effect of Hispanic drivers remains significant, showing that specialty

Table 28. Random Effect Hierarchical Models Predicting Arrest Controlling For Specialty Assignment

	Model 1		Model 2	
	B	Odds	B	Odds
Speciality Assignments				
Work Zone Enforcement	-0.902	0.406	-1.450*	0.235*
	(0.480)		(0.729)	
Aggressive Driving	-0.793*	0.452*	-0.737	0.479
	(0.347)		(0.384)	
DUI Task Force	0.115	1.122	0.089	1.093
	(0.168)		(0.199)	
Click it or Ticket	-0.187	0.829	-0.087	0.917
	(0.315)		(0.356)	
Work Zone Enforcement * Driver is Hispanic			1.255	3.508
			(0.952)	
Aggressive Driving * Driver is Hispanic			-0.243	0.784
			(0.823)	
DUI Task Force * Driver is Hispanic			0.083	1.086
			(0.333)	
Click it or Ticket * Driver is Hispanic			-0.368	0.692
			(0.701)	
Situational Characteristics:				
Number of Passenger in vehicle	0.089*	1.093*	0.089*	1.093*
	(0.030)		(0.030)	
Stop occurs between 12am to 5:59am	0.537*	1.712*	0.537*	1.712*
	(0.093)		(0.093)	
Stop occurs between 9pm and 11:59pm	0.141	1.151	0.141	1.152
	(0.090)		(0.090)	
Stop occurs in the fall	-0.183*	0.833*	-0.184*	0.832*
	(0.085)		(0.085)	
Stop occurs in the winter	-0.383*	0.682*	-0.383*	0.682*
	(0.089)		(0.089)	
Stop occurs in the spring	-0.133	0.876	-0.134	0.875
	(0.087)		(0.087)	
Vehicle has AZ licence plate	0.126	1.134	0.127	1.136
	(0.117)		(0.117)	
Driver Characteristics:				
Driver is Native American	0.874*	2.397*	0.874*	2.396*
	(0.223)		(0.223)	
Driver is Asian	-0.739*	0.477*	-0.738*	0.478*
	(0.301)		(0.301)	
Driver is Black	0.645*	1.906*	0.645*	1.906*
	(0.098)		(0.098)	
Driver is Hispanic	0.520*	1.682*	0.516*	1.675*
	(0.071)		(0.073)	
Driver is male	0.391*	1.478*	0.390*	1.478*
	(0.066)		(0.066)	
Driver's age in years	-0.016*	0.984*	-0.016*	0.984*
	(0.002)		(0.002)	
Deputy Characteristics:				
Length of employment at MCSO	0.001	1.001	0.001	1.001
	(0.010)		(0.010)	
Deputy is Other Race	-0.537*	0.584*	-0.536*	0.585*
	(0.190)		(0.190)	
Deputy is Hispanic	-0.234	0.791	-0.233	0.792
	(0.331)		(0.331)	
Rank is Deputy	-0.503*	0.605*	-0.504*	0.604*
	(0.254)		(0.253)	
Contextual Characteristics:				
District 2	-0.248	0.780	-0.249	0.779
	(0.150)		(0.150)	
District 3	0.010	1.011	0.009	1.010
	(0.148)		(0.148)	
District 4	-0.137	0.872	-0.140	0.870
	(0.166)		(0.166)	
District 6	-0.453*	0.636*	-0.451*	0.637*
	(0.179)		(0.179)	
District 7	-0.466*	0.627*	-0.463*	0.629*
	(0.157)		(0.158)	
Lake District	-0.718*	0.488*	-0.721*	0.486*
	(0.250)		(0.250)	
Constant	-2.603*	0.074*	-2.601*	0.074*
	(0.331)		(0.331)	
Observations	22,233		22,233	
Number of groups	338		338	

Standard errors in parentheses

* p<0.05

Table 29. Random Effect Hierarchical Models Predicting Citation Controlling For Specialty Assignment

	Model 1		Model 2	
	B	Odds	B	Odds
Specialty Assignments:				
Work Zone Enforcement	0.923*	2.517*	0.814*	2.257*
	(0.176)		(0.188)	
Agressive Driving	1.398*	4.049*	1.408*	4.089*
	(0.156)		(0.168)	
DUI Task Force	-0.389*	0.678*	-0.446*	0.640*
	(0.095)		(0.109)	
Click it or Ticket	1.553*	4.727*	1.595*	4.927*
	(0.222)		(0.249)	
Work Zone Enforcement*Hispanic	-	-	0.771	2.162
	-	-	(0.562)	
Agressive Driving*Hispanic	-	-	-0.069	0.933
	-	-	(0.443)	
DUI Task Force*Hispanic	-	-	0.234	1.264
	-	-	(0.218)	
Click it or Ticket*Hispanic	-	-	-0.207	0.813
	-	-	(0.538)	
Situational Characteristics:				
Number of Passenger in vehicle	-0.043*	0.958*	-0.043*	0.958*
	(0.016)		(0.016)	
Stop Occurs between 12am to 5:59am	-0.543*	0.581*	-0.543*	0.581*
	(0.044)		(0.044)	
Stop Occurs between 9pm and 11:59pm	-0.634*	0.531*	-0.634*	0.531*
	(0.039)		(0.039)	
Stop occurs in the fall	-0.059	0.943	-0.059	0.943
	(0.040)		(0.040)	
Stop occurs in the winter	0.053	1.055	0.053	1.054
	(0.041)		(0.041)	
Stop occurs in the spring	-0.012	0.988	-0.013	0.987
	(0.041)		(0.041)	
Vehicle has AZ licence plate	0.084	1.088	0.084	1.087
	(0.050)		(0.050)	
Driver Characteristics:				
Driver is Native American	0.384*	1.468*	0.385*	1.470*
	(0.143)		(0.143)	
Driver is Asian	0.002	1.002	0.003	1.003
	(0.095)		(0.095)	
Driver is Black	0.101	1.106	0.101	1.106
	(0.054)		(0.054)	
Driver is Hispanic	0.190*	1.209*	0.181*	1.199*
	(0.036)		(0.037)	
Driver is Male	0.006	1.006	0.006	1.006
	(0.029)		(0.029)	
Driver's age in years	-0.016*	0.985*	-0.016*	0.985*
	(0.001)		(0.001)	
Deputy Characteristics:				
Length of employment at MCSO	0.019*	1.019*	0.019*	1.019*
	(0.002)		(0.002)	
Deputy is Hispanic	-0.145*	0.865*	-0.145*	0.865*
	(0.037)		(0.037)	
Deputy is Other Race	-0.385*	0.680*	-0.385*	0.680*
	(0.078)		(0.078)	
Rank is deputy	-0.247*	0.781*	-0.247*	0.781*
	(0.076)		(0.076)	
Contextual Characteristics:				
District 2	0.182*	1.199*	0.182*	1.199*
	(0.049)		(0.049)	
District 3	-0.046	0.955	-0.046	0.955
	(0.048)		(0.048)	
District 4	-0.137*	0.872*	-0.138*	0.871*
	(0.057)		(0.057)	
District 6	0.937*	2.553*	0.938*	2.556*
	(0.090)		(0.090)	
District 7	0.370*	1.448*	0.370*	1.448*
	(0.050)		(0.050)	
Lakes Disrict	0.684*	1.982*	0.683*	1.979*
	(0.058)		(0.058)	
Constant	0.625*	1.867*	0.628*	1.874*
	(0.110)		(0.110)	
Observations	22,233		22,233	
Number of groups	338		338	

Standard errors in parentheses; * p<0.05

Table 30. Random Effect Hierarchical Models Predicting the Logged Length of Stop Controlling For Specialty Assignment

	Model 1		Model 2	
	B	SE	B	SE
Speciality Assignments				
Work Zone Enforcement	-0.119*	(0.030)	-0.108*	(0.033)
Aggressive Driving	-0.099*	(0.023)	-0.099*	(0.025)
DUI Task Force	-0.027	(0.019)	-0.028	(0.021)
Click it or Ticket	-0.083*	(0.029)	-0.080*	(0.032)
Work Zone Enforcement * Driver is Hispanic	-	-	-0.060	(0.070)
Aggressive Driving * Driver is Hispanic	-	-	-0.001	(0.058)
DUI Task Force * Driver is Hispanic	-	-	0.004	(0.041)
Click it or Ticket * Driver is Hispanic	-	-	-0.016	(0.065)
Situational Characteristics:				
Number of Passenger in vehicle	0.010*	(0.003)	0.010*	(0.003)
Stop occurs between 12am to 5:59am	0.046*	(0.010)	0.046*	(0.010)
Stop occurs between 9pm and 11:59pm	0.045*	(0.009)	0.045*	(0.009)
Stop occurs in the fall	-0.000	(0.008)	-0.000	(0.008)
Stop occurs in the winter	-0.044*	(0.008)	-0.044*	(0.008)
Stop occurs in the spring	-0.054*	(0.008)	-0.054*	(0.008)
Vehicle has AZ licence plate	-0.166*	(0.010)	-0.166*	(0.010)
Driver was arrested	0.657*	(0.015)	0.657*	(0.015)
Vehicle was searched	0.723*	(0.020)	0.723*	(0.020)
Technical Problems Encountered During Stop	0.244*	(0.012)	0.244*	(0.012)
Stop Involves DUI	0.451*	(0.023)	0.451*	(0.023)
Stop Involves Tow	0.850*	(0.019)	0.850*	(0.019)
Stop Involves Deputy Training	0.166*	(0.038)	0.166*	(0.038)
Language Barrier	0.254*	(0.028)	0.253*	(0.028)
Driver Characteristics:				
Driver is Native American	0.037	(0.026)	0.038	(0.026)
Driver is Asian	0.030	(0.018)	0.030	(0.018)
Driver is Black	0.057*	(0.010)	0.057*	(0.010)
Driver is Hispanic	0.065*	(0.007)	0.066*	(0.007)
Driver is male	0.004	(0.005)	0.004	(0.005)
Driver's age in years	-0.001*	(0.000)	-0.001*	(0.000)
Deputy Characteristics:				
Length of employment at MCSO	0.008*	(0.001)	0.008*	(0.001)
Deputy is Hispanic	0.054*	(0.026)	0.054*	(0.026)
Deputy is Other Race	-0.052	(0.046)	-0.052	(0.046)
Rank is Deputy	-0.046	(0.036)	-0.046	(0.036)
Contextual Characteristics:				
District 2	-0.079*	(0.018)	-0.079*	(0.018)
District 3	-0.014	(0.018)	-0.014	(0.018)
District 4	0.038*	(0.019)	0.038*	(0.019)
District 6	-0.038*	(0.016)	-0.039*	(0.016)
District 7	0.026	(0.027)	0.026	(0.027)
Lake District	0.001	(0.019)	0.001	(0.019)
Constant	2.520*	(0.044)	2.520*	(0.044)
Observations	22,233		22,233	
Number of groups	338		338	

Standard errors in parentheses

* p<0.05

assignment is not related to Hispanic drivers being more or less likely to receive citations.

The relationship between specialty assignment and length of stop is shown in Table 30. In Model 1, all specialty assignments, except DUI Task Force, have a negative effect, showing that stops conducted by deputies on specialty assignments typically have shorter lengths. In Model 2, the interactions between specialty assignment and Hispanic driver are included and none are significant. The Hispanic driver effect remains significant and positive. This shows that specialty assignment does not produce differential length of stops for Hispanic drivers.

6.8 Results: Examining Random Effects to determine if there are Outlier Deputies

Given that the models employed in this report are meant to test whether there are deputies engaging in problematic policing, as well as ascertaining if biased policing is a systemic issue within the traffic enforcement section of the MCSO, it is useful to look at random effects and the 95% confidence interval around each random effect for the deputies. Remember than hierarchical linear models with random effects estimate the likelihood of an outcome and allow the level two unit, in our models that is the deputy level, to randomly effect that outcome. Models subsequently produce random effects that allow us to understand how each deputy contributes to the outcome. In essence, random effects are a numerical estimate of how each deputy uniquely contributes to the likelihood of a specific outcome. As an example, after controlling for all the factors we model that are related to whether an arrest occurs in a particular stop, the random effect shows us what a specific deputy contributes to the likelihood of an arrest. This offers an effective means of identifying which deputies are targeting Hispanics. If a deputies contribution to the likelihood of arrest is significantly (i.e., under $p < 0.05$) larger than the average, then we can say that that deputy may be engaged in biased policing. To do this, we use the standard models for our outcomes and add a random effect for Hispanic drivers. The level one equation is represented as:

$$\Lambda(\Pr Y_{ij} = 1) = \beta_0 + \beta_1 S_j + \beta_2 D_j + \beta_3 Dep_j + \beta_4 T_j$$

Where Λ is the logit function, Y_{ij} is the outcome (e.g., arrest or search) for stop i nested in unit j, β_0 represents the random intercept across time, S_j is a matrix of the stop characteristics with effects captured in a β_1 vector, D_j is a matrix of the driver-specific variables with effects captured in a β_2 vector, Dep_j is a matrix of the deputy characteristics with effects captured in a β_3 vector, and T_j is the matrix of the time and seasonal variables with their effects captured in β_4. The level two equation for the length of stop outcome is shown as:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{2j} = \gamma_{20} + u_{2j}$$

Where β_{0j} is the mean length of stop for the j^{th} unit, γ_{00} represents the grand mean length of stop for the traffic enforcement portion of the MCSO, and u_{0j} is the random effect associated with unit *j*, which has a mean of zero and a variance of τ_{00}. Additionally, β_{2j} is the average regression slope for Hispanic drivers for length of stop, γ_{20} is the grand mean for Hispanic drivers on length of stop for the within the traffic enforcement portion of the MCSO, and u_{2j} is the random effect associated with Hispanic drivers across deputies.

Once the random effect is calculated, we construct a 95% confidence interval around the deputy-specific random effect.[21] If a deputy's random effect does not contain the average likelihood of an outcome occurring, then we should be concerned about that particular deputy's behavior and perhaps investigate their stop activity.

For most models, regardless of the outcome, one would expect to see some variability in the random effects, with perhaps a few outliers. For these models (shown in Figures 4 and 5), there are very few outliers; this suggests that differences in outcomes for Hispanics are happening relatively uniformly across deputies. Put another way,

This suggests that the racial differences in post-stop outcomes that are seen throughout the results of this report are not due to outlier deputies, but is more likely a systemic issue within the patrol function of the MCSO.

Figure 4 displays the distribution of deputy specific random slope for the Hispanic effect on citation surrounded by a 95% confidence interval. Each deputy's random effect score is represented by the dark red dot, the dark blue vertical lines show the 95% confidence interval around the deputy's score, while the horizontal red line is the overall average score. As you can see there is little to no variability in the deputy specific random slope. For the outcome of arrest, there are no deputies that are significantly above or below the organizational mean. Put simply, this model does not identify any deputy who is an outlier for arrest and as such, we do not show the model here.

There were similar results for the outcome of search, shown in Figure 5. Only one deputy is identified as having a significantly different likelihood of searches of Hispanics, and for this deputy, they were significantly below the organizational average. Like citation and arrest, there are no deputies who are significantly above or below the organizational mean for the likelihood of citations.

However, when examining the random effects for deputies on the length of stop outcome, we do see a number of deputies who are outside of the organizational mean. Figure 6 shows the deputy specific random effects plotted around the organizational mean. There are approximately 86 deputies whose random effect shows that they are significantly above the organizational mean. These deputies are shown on the right side of the figure. Conversely, there are 30 deputies who are significantly below the organizational mean; these deputies are shown in the left hand side of the figure. Thus, this finding shows, that net of the controls that are in the model, there are a number of deputies who are uniquely contributing to significantly higher length of stops for Hispanics (see Appendix H).

[21] The p-value tells us the likelihood of the null hypotheses being true; if we set our p-value to 0.05, we know that if we obtain a p-value at or less than 0.05, that the null hypothesis is only likely to be correct 5% or less of the time. Confidence intervals capitalize on the p-value to estimate the middle 95% of a distribution. So we can take a point estimate, such as a random effect, standardize it, and be able to estimate that "95% of the time, the random effect will be between Score A and Score B." When the confidence interval around a random effect does not contain the overall mean from our model, then we know that that deputy's random effect is very unlikely (less than 5% likely) to contain the average. Put another way, it is unlikely that the deputy is very similar to what is average in the model, and thus are significantly contributing to the likelihood of a specific outcome for Hispanics.

Figure 3.The Deputy-Specific Odds-Ratio for Citation Typical Stop

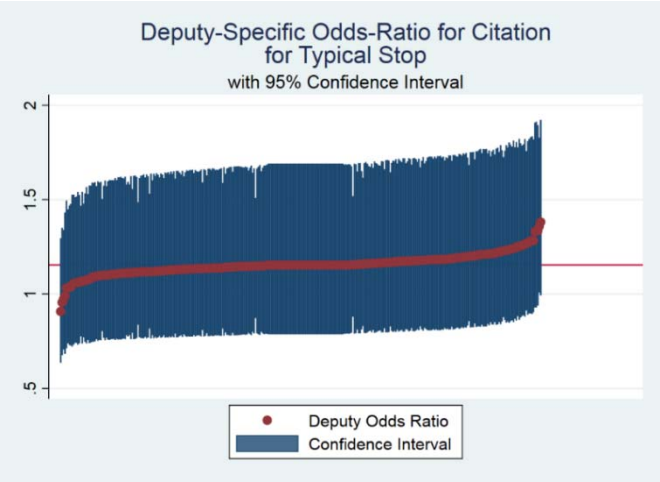


Figure 4. The Deputy-Specific Probability of Hispanic Search for Typical Stop

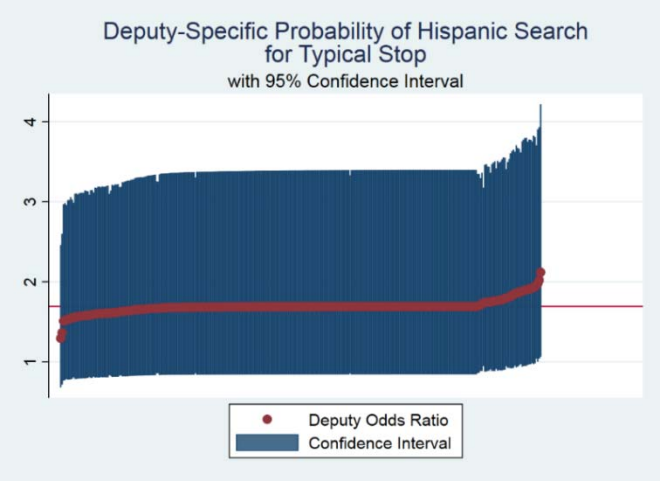
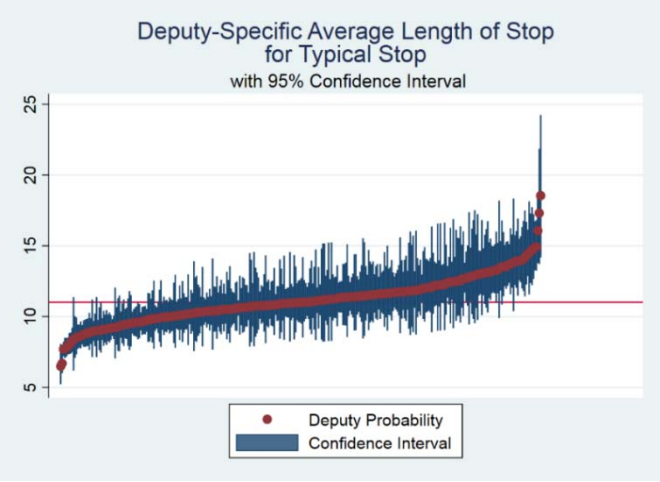


Figure 5. The Deputy Specific Average Length of Stop for a Typical Stop



These models were specifically designed to assess whether there is evidence of systemic bias within the MCSO's patrol function or the differential effects across race/ethnicity are due to a few deputies who show a pattern of problematic behavior. If the differential race effects were only due to a few deputies, then we would see a few confidence intervals in the figures above that fall above of the overall mean. However, this is not the case. Given that the majority of deputies (sometimes all of the deputies as is the case in citation, arrest, and search) are not outliers, the differential race effects does not appear to be due to a few deputies but rather occurs over the entirety of the patrol function of the MCSO. However, there are a number of deputies contributing to problems with the length of stop for Hispanic drivers.

6.9 Results: Longitudinal Changes in the Relationship between Post-Stop Outcomes and Driver Race/Ethnicity

In all the models in this section, many of the same predictors are significant, and will not be discussed here, though the totality of the models are shown. Instead, we focus on two coefficients (or odds ratios where appropriate): the variables for the two previous fiscal years 2014-2015 and 2015-2016 and the interaction between the fiscal year variables and the Hispanic driver variable. The significance, size, and direction of the fiscal year variables will show if there have been changes in the outcome over time. Additionally, the interaction between the fiscal year dummy variable and Hispanic will show if there have been changes in the outcome overtime for Hispanics.

6.9.1 Arrest and Search

Descriptive statistics for the percent of arrests and search by race/ethnicity are displayed in Table 31. The proportion of arrests that are of Whites decreases slightly from 55.2% in the 2014-2015 fiscal year to 52.4% in 2015-2016 and 52.1% in 2016-2017. Proportion of arrested drivers who were Native American and Asian also decreased slightly. These differences are made up by increases for Black drivers (from 9.3% to 12.3%) and Hispanic drivers (30.6% to 32.5%). Similar trends of small magnitude are observed for drivers' race/ethnicity and search. These relative proportions mask nearly a one-third decrease in the volume of arrests from the 2015-2016 fiscal year to the 2016-2017 fiscal year. This drop was particularly sharp among Native American drivers, with less than half as many arrests in 2016-2017 as in 2015-2016.

Table 31. Descriptive Statistics by Race/Ethnicity for Arrest and Search across Reporting Years

Arrest			
	2014-2015	2015-2016	2016-2017
White	55.20%	52.38%	52.14%
Native American	3.71%	2.95%	2.07%
Hispanic	30.62%	31.20%	32.54%
Black	9.25%	11.99%	12.33%
Asian	1.22%	1.47%	0.92%
Search			
	2014-2015	2015-2016	2016-2017
White	52.26%	49.37%	50.89%
Native American	4.74%	4.21%	1.93%
Hispanic	32.17%	32.31%	33.17%
Black	9.93%	13.20%	12.56%
Asian	0.90%	0.91%	1.45%

Table 32. Random Effect Hierarchical Models Predicting Differences in Arrests of Hispanics Over Time

	Model 1		Model 2	
	B	Odds	B	Odds
Fiscal Year 15-16	0.043	1.044	0.055	1.056
	(0.146)		(0.185)	
Fiscal Year 16-17	0.142	1.153	0.362	1.437
	(0.324)		(0.342)	
Fiscal Year 15-16*Driver is Hispanic			-0.034	0.967
			(0.274)	
Fiscal Year 16-17*Driver is Hispanic			-0.691	0.501
			(0.359)	
Situational Characteristics:				
Number of Passenger in vehicle	0.079	1.082	0.079	1.082
	(0.056)		(0.056)	
Stop occurs between 12am to 5:59am	0.609*	1.839*	0.608*	1.837*
	(0.158)		(0.158)	
Stop occurs between 9pm and 11:59pm	0.354*	1.425*	0.352*	1.422*
	(0.162)		(0.162)	
Stop occurs in the fall	-0.086	0.917	-0.085	0.919
	(0.199)		(0.199)	
Stop occurs in the winter	0.188	1.207	0.190	1.209
	(0.188)		(0.189)	
Stop occurs in the spring	0.056	1.058	0.057	1.059
	(0.193)		(0.193)	
Vehicle has AZ licence plate	0.035	1.035	0.022	1.022
	(0.251)		(0.251)	
Driver Characteristics:				
Driver is Native American	1.515*	4.550*	1.534*	4.635*
	(0.305)		(0.305)	
Driver is Asian	-0.076	0.927	-0.078	0.925
	(0.461)		(0.461)	
Driver is Black	0.384	1.468	0.382	1.465
	(0.218)		(0.218)	
Driver is Hispanic	0.763*	2.145*	0.913*	2.491*
	(0.138)		(0.213)	
Driver is male	0.647*	1.910*	0.644*	1.905*
	(0.142)		(0.142)	
Driver's age in years	-0.024*	0.977*	-0.024*	0.976*
	(0.005)		(0.005)	
Deputy Characteristics:				
Length of employment at MCSO	-0.015	0.985	-0.015	0.985
	(0.015)		(0.015)	
Deputy is Hispanic	-0.220	0.803	-0.221	0.802
	(0.255)		(0.255)	
Deputy is Other Race	-1.066	0.344	-1.066	0.344
	(0.559)		(0.559)	
Rank is Deputy	-0.504	0.604	-0.504	0.604
	(0.316)		(0.316)	
Contextual Characteristics:				
District 2	-0.065	0.937	-0.064	0.938
	(0.228)		(0.227)	
District 3	-0.314	0.731	-0.318	0.728
	(0.240)		(0.241)	
District 4	-0.340	0.712	-0.335	0.715
	(0.256)		(0.256)	
District 6	-0.165	0.848	-0.164	0.848
	(0.334)		(0.334)	
District 7	-1.226*	0.294*	-1.225*	0.294*
	(0.360)		(0.360)	
Lake District	-0.966*	0.381*	-0.972*	0.378*
	(0.412)		(0.413)	
Constant	-5.520*	0.004*	-5.562*	0.004*
	(0.511)		(0.515)	
Observations	66,212		66,212	
Number of groups	502		502	

Standard errors in parentheses

* p<0.05

Table 33. Random Effect Hierarchical Models Predicting Differences in Searches of Hispanics Over Time

	Model 1		Model 2	
	B	Odds	B	Odds
Fiscal Year 15-16	-0.152	0.859	-0.055	0.947
	(0.118)		(0.140)	
Fiscal Year 16-17	-0.354	0.702	-0.401	0.670
	(0.265)		(0.286)	
Fiscal Year 15-16*Driver is Hispanic			-0.302	0.739
			(0.235)	
Fiscal Year 16-17*Driver is Hispanic			0.146	1.157
			(0.301)	
Situational Characteristics:				
Driver was Arrested	6.415*	610.982*	6.425*	617.326*
	(0.180)		(0.180)	
Number of Passenger in vehicle	0.102*	1.108*	0.102*	1.107*
	(0.046)		(0.046)	
Stop occurs between 12am to 5:59am	0.593*	1.810*	0.596*	1.815*
	(0.133)		(0.133)	
Stop occurs between 9pm and 11:59pm	0.381*	1.463*	0.380*	1.462*
	(0.134)		(0.134)	
Stop occurs in the fall	-0.156	0.855	-0.156	0.856
	(0.165)		(0.165)	
Stop occurs in the winter	-0.019	0.981	-0.019	0.981
	(0.159)		(0.159)	
Stop occurs in the spring	0.174	1.190	0.177	1.193
	(0.149)		(0.149)	
Vehicle has AZ licence plate	-0.004	0.996	0.001	1.001
	(0.199)		(0.199)	
Driver Characteristics:				
Driver is Native American	1.008*	2.740*	1.008*	2.741*
	(0.305)		(0.305)	
Driver is Asian	-1.148*	0.317*	-1.139*	0.320*
	(0.548)		(0.547)	
Driver is Black	0.423*	1.527*	0.523*	1.687*
	(0.117)		(0.171)	
Driver is Hispanic	0.416*	1.516*	0.418*	1.519*
	(0.173)		(0.173)	
Driver is male	0.602*	1.826*	0.602*	1.826*
	(0.116)		(0.116)	
Driver's age in years	-0.035*	0.966*	-0.035*	0.966*
	(0.004)		(0.004)	
Deputy Characteristics:				
Length of employment at MCSO	-0.007	0.993	-0.007	0.993
	(0.013)		(0.013)	
Deputy is Hispanic	-0.259	0.772	-0.260	0.771
	(0.223)		(0.223)	
Deputy is Other	0.123	1.130	0.124	1.132
	(0.373)		(0.373)	
Rank is Deputy	0.046	1.047	0.048	1.049
	(0.286)		(0.286)	
Contextual Characteristics:				
District 2	0.023	1.023	0.021	1.021
	(0.199)		(0.199)	
District 3	0.115	1.121	0.118	1.125
	(0.203)		(0.203)	
District 4	-0.425	0.654	-0.420	0.657
	(0.242)		(0.243)	
District 6	-0.034	0.966	-0.027	0.974
	(0.272)		(0.272)	
District 7	-1.323*	0.266*	-1.322*	0.267*
	(0.318)		(0.318)	
Lake District	-0.476	0.621	-0.469	0.626
	(0.336)		(0.336)	
Constant	-5.336*	0.005*	-5.379*	0.005*
	(0.442)		(0.444)	
Observations	66,212		66,212	
Number of groups	502		502	

Standard errors in parentheses

* $p < 0.05$

Next we examine the outcomes of arrest and search. We conducted two analyses for arrest,[22] shown in Table 32. Model 1 includes the fiscal year dummy variables, comparing the likelihood of arrest between the three fiscal years, controlling for situational, driver, deputy, and contextual characteristics of stops. Model 2 adds interactions of the 2015-2016 and 2016-2017 fiscal year indicators and Hispanic, which assesses whether the odds of arrest differ in these fiscal years compared to the 2014-2015 fiscal year for Hispanic drivers. Neither of the interaction terms in Model 2 are statistically significant. Together, these models show that Hispanics are more likely to be arrested than Whites in general and second, that the likelihood of Hispanics being arrested has not significantly changed over time.

Examining search outcomes in Model 1 of Table 33, we see that overall, there were no significant differences in the likelihood of search across years after controlling for situational, driver, deputy, and contextual characteristics.[23] Over these three years, the likelihood of search is strongly related to driver race/ethnicity. Compared to Whites, the odds of search are 1.5 times higher for Hispanics and Blacks, and 2.7 times higher for Native Americans. In Model 2 of Table 33, we assess whether the likelihood of search has changed for Hispanic drivers over these three years; neither of the interaction terms in Model 2 are statistically significant. As with arrest, the increased likelihood of Hispanics being searched has not changed over time.

6.9.2 Length of Stop

Next, we examine the length of stop by race/ethnicity across fiscal years. Table 34 presents the descriptive statistics for length of stop across fiscal years by race/ethnicity. Between 2014-2015, 2015-2016, and 2016-2017, we see that length of stop has generally decreased for drivers of all races and ethnicities. For instance, the average length of stops for Hispanics was 28 minutes in 2014-2015, 22 minutes in 2015-2016, and 16 minutes in 2016-2017. Figure 7 shows these averages in a bar graph by comparing the average length of stop for Hispanic across years to the average length of stop for non-Hispanics, across years.

In Table 35, we model the differences in length of stop over time by driver race/ethnicity. Average length of stop was 59.2% shorter in fiscal year 2016-2017 relative to fiscal year 2014-2015, a dramatic decrease. Additionally, Hispanic drivers, on average, have longer stop times than do Whites. That said, the interactions between Hispanic drivers and the 2015-2016 and 2016-2017 fiscal years show a significant drop in the length of stop for Hispanic drivers. In prior years, Hispanic drivers have been subject to longer stops than White drivers, and the 2016-2017 fiscal year is no exception. On average, Whites were subject to slightly shorter stops (18 minutes) compared to Hispanics (19 minutes). Across years, the descriptive statistics in Table 34 show that the length of stop for Hispanic drivers has decreased: 17 minutes in 2015-2016 and 16.8 in 2016-2017, suggesting moderate improvement in this outcome for Hispanic drivers.

[22] Remember that for both arrest and search, we examine all outcomes – both discretionary and non-discretionary – searches and arrests.

[23] This finding diverges from the findings reported in the Yearly Report for the Maricopa County Sheriff's Office, Years 2015-2016 (see Wallace et al., 2017, p78). One explanation for these divergent findings is the use of additional control variables that were not included in prior analysis. Specifically, situational characteristics like the time of the stop (early a.m. or late p.m.) were not included in prior analysis. These situational characteristics significantly predict a change in the likelihood of arrest and search, and may account for the differences observed in the previous analysis.

Table 34. Descriptive Statistics of Length of Stop by Race/Ethnicity and Reporting Year

	Report Year 2014-2015			Report Year 2015-2016			Report Year 2016-2017		
	N of Race Specific Stops	Mean	Std. Dev.	N of Race Specific Stops	Mean	Std. Dev.	N of Race Specific Stops	Mean	Std. Dev.
White	17799	22.47	73.59	20190	18.93	62.81	14804	12.78	30.77
Native American	408	33.49	84.41	410	28.22	88.58	237	14.97	17.47
Hispanic	5429	27.71	77.44	6646	21.98	60.90	4985	15.87	33.93
Black	1891	29.68	96.00	2287	23.26	68.69	1707	16.34	43.35
Asian	574	24.39	92.45	634	20.80	85.00	500	12.23	18.32
Overall	26350	24.29	77.06	30235	20.13	64.28	22233	13.76	32.34

Figure 6. The Average Hispanic and Non-Hispanic Length of Stop by Report Year

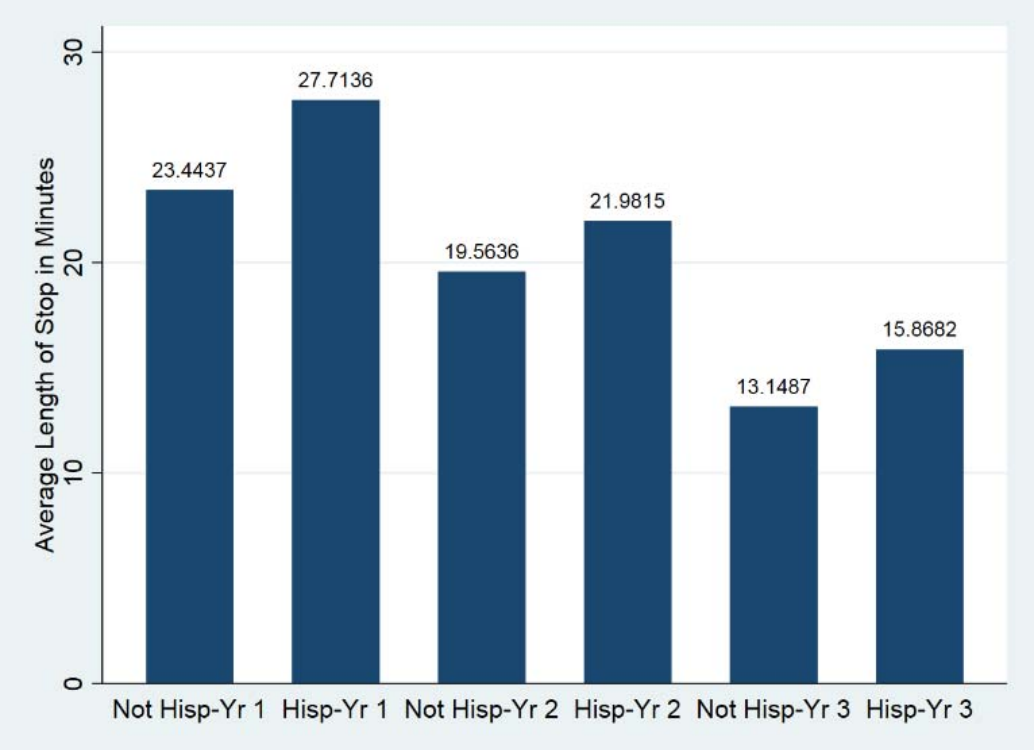


Table 35. Random Effect Hierarchical Models Predicting Differences in the Logged Length of Stop of Hispanics Over Time

	B	SE	B	SE
Fiscal Year 15-16	-0.097*	(0.005)	-0.089*	(0.005)
Fiscal Year 16-17	-0.592*	(0.010)	-0.586*	(0.011)
Fiscal Year 15-16 * Hispanic			-0.034*	(0.011)
Fiscal Year 16-17 * Hispanic			-0.032*	(0.013)
Situational Characteristics:				
Number of passengers in vehicle	0.012*	(0.002)	0.012*	(0.002)
Stop occurs between 6am - 8:59pm	0.045*	(0.006)	0.045*	(0.006)
Stop occurs between 9pm - 11:59pm	0.038*	(0.006)	0.038*	(0.006)
Stop occurs in the fall	-0.031*	(0.006)	-0.031*	(0.006)
Stop occurs in the winter	-0.034*	(0.006)	-0.034*	(0.006)
Stop occurs in the spring	-0.051*	(0.006)	-0.050*	(0.006)
Vehicle has AZ licence plate	-0.121*	(0.008)	-0.121*	(0.008)
Driver was arrested	0.640*	(0.010)	0.640*	(0.010)
Vehicle was searched	0.593*	(0.014)	0.593*	(0.014)
Technical problems encountered during stop	0.398*	(0.010)	0.398*	(0.010)
Stop involves DUI	0.749*	(0.017)	0.749*	(0.017)
Stop involves tow	0.819*	(0.016)	0.820*	(0.016)
Stop involves deputy training	0.108*	(0.031)	0.108*	(0.031)
Language barrier	0.355*	(0.029)	0.359*	(0.029)
Driver Characteristics:				
Driver is Native American	0.036*	(0.017)	0.037*	(0.017)
Driver is Asian	0.053*	(0.005)	0.075*	(0.008)
Driver is Black	0.015	(0.013)	0.015	(0.013)
Driver is Hispanic	0.064*	(0.007)	0.064*	(0.007)
Driver is male	0.016*	(0.004)	0.016*	(0.004)
Driver's age in years	-0.002*	(0.000)	-0.002*	(0.000)
Deputy Characteristics:				
Length of employment at MCSO	0.001	(0.001)	0.001	(0.001)
Deputy is Hispanic	0.073*	(0.023)	0.073*	(0.023)
Deputy is of Other Race	0.046	(0.038)	0.046	(0.038)
Rank is Deputy	-0.021	(0.027)	-0.021	(0.026)
Contextual Characteristics:				
District 2	-0.021	(0.012)	-0.022	(0.012)
District 3	0.017	(0.012)	0.017	(0.012)
District 4	0.013	(0.011)	0.013	(0.011)
District 6	0.024*	(0.012)	0.024*	(0.012)
District 7	-0.039*	(0.012)	-0.039*	(0.012)
Lake District	0.002	(0.015)	0.003	(0.015)
Constant	2.893*	(0.033)	2.889*	(0.033)
Observations	70,464		70,464	
Number of groups	510		510	

Standard errors in parentheses

* p<0.05

6.9.3 Citations v. Warnings

Table 36 shows the percentage of citations and percentage of warnings over the course of the last three report years. As seen here, there is very little change in the percentage of citations or warnings by race/ethnicity across the fiscal years. Hispanics see just over a 1% increase the percent of stops resulting in a citation or warning between 2014 and 2017.

Table 36. Descriptive Statistics for Citations v. Warnings by Race/Ethnicity across Fiscal Years

	Citations		
	2014-2015	2015-2016	2016-2017
White	67.04%	64.97%	65.29%
Native American	1.78%	1.51%	1.25%
Hispanic	22.02%	23.49%	23.63%
Black	7.06%	7.89%	7.67%
Asian	2.09%	2.15%	2.16%
	Warnings		
	2014-2015	2015-2016	2016-2017
White	70.10%	69.34%	68.38%
Native American	1.14%	1.16%	0.83%
Hispanic	18.93%	20.20%	20.78%
Black	7.55%	7.22%	7.67%
Asian	2.29%	2.07%	2.33%

Table 37 presents the results from the longitudinal model testing racial differences in citations over the three fiscal years, net of controls. Note that in these models, we predict citations that are not associated with arrest and compare them to warnings for all years of data. Model 1 shows the main effects of the reporting years. First, compared to 2014-2015, the odds of stops resulting in a citation are approximately 8.3% lower in 2015-2016 and approximately 19.3% lower in 2016-2017. Also presented in Model 1, Hispanics are more likely – about 1.065 times higher odds – to receive a citation than Whites. In Model 2, we interact the reporting year variable with the Hispanic driver variable to determine how the Hispanic specific effect on citations has changed over time. We see that there is not a difference in the likelihood of citations for Hispanics for the reporting years of 2015-2016 and 2016-2017 when compared to 2014-2015. The main effect of Hispanic is no longer significant; this suggests that while there are not significant differences between the likelihood of Hispanic drivers receiving citations across years, the relationship between Hispanic drivers and the reporting year does moderate the relationship between Hispanics and citations.

6.10 A Discussion of Model Fit

When conducting inferential statistics, model fit statistics reveal the proportion of variance the model explains, helping us to understand how well the outcome is predicted with the model employed. Model fit statistics range from 0 to 1, with high model fit statistics showing that the model explains large portions of the variance in the outcome, as well as providing evidence that the predictors used in the model are effective at estimating the outcome. Conversely, low model fit statistics show that the model explains smaller portions of the variance, suggesting that there may be omitted variables that could be used to better fit the model.

Table 37. Random Effect Hierarchical Models Predicting Differences Citations of Hispanics Over Time

	Model 1		Model 2	
	B	Odds	B	Odds
Fiscal Year 15-16	-0.087*	0.917*	-0.097*	0.908*
	(0.023)		(0.025)	
Fiscal Year 16-17	-0.214*	0.807*	-0.201*	0.818*
	(0.048)		(0.050)	
Fiscal Year 15-16 * Hispanic			0.046	1.047
			(0.050)	
Fiscal Year 16-17 * Hispanic			-0.069	0.933
			(0.060)	
Situational Characteristics:				
Number of Passenger in vehicle	-0.038*	0.963*	-0.038*	0.963*
	(0.010)		(0.010)	
Stop occurs between 12am to 5:59am	-0.679*	0.507*	-0.679*	0.507*
	(0.028)		(0.028)	
Stop occurs between 9pm and 11:59pm	-0.720*	0.487*	-0.720*	0.487*
	(0.027)		(0.027)	
Stop occurs in the fall	-0.017	0.983	-0.017	0.983
	(0.030)		(0.030)	
Stop occurs in the winter	-0.069*	0.933*	-0.069*	0.934*
	(0.029)		(0.029)	
Stop occurs in the spring	0.008	1.008	0.008	1.008
	(0.029)		(0.029)	
Vehicle has AZ licence plate	0.050	1.051	0.048	1.049
	(0.036)		(0.036)	
Driver Characteristics:				
Driver is Native American	0.212*	1.236*	0.213*	1.237*
	(0.081)		(0.081)	
Driver is Asian	0.059	1.060	0.058	1.060
	(0.060)		(0.060)	
Driver is Black	-0.022	0.978	-0.022	0.978
	(0.035)		(0.035)	
Driver is Hispanic	0.063*	1.065*	0.058	1.060
	(0.023)		(0.038)	
Driver is Male	-0.004	0.996	-0.004	0.996
	(0.018)		(0.018)	
Driver's age in years	-0.015*	0.985*	-0.015*	0.985*
	(0.001)		(0.001)	
Deputy Characteristics:				
Length of employment at MCSO	0.013	1.013	0.013	1.013
	(0.008)		(0.008)	
Deputy is Hispanic	-0.125	0.882	-0.125	0.882
	(0.141)		(0.141)	
Deputy is Other	0.042	1.043	0.042	1.043
	(0.233)		(0.232)	
Rank is Deputy	0.281	1.325	0.282	1.325
	(0.163)		(0.163)	
Contextual Characteristics:				
District 2	0.159*	1.172*	0.159*	1.172*
	(0.059)		(0.059)	
District 3	0.287*	1.333*	0.285*	1.330*
	(0.061)		(0.061)	
District 4	0.196*	1.217*	0.196*	1.216*
	(0.055)		(0.055)	
District 6	0.354*	1.425*	0.353*	1.424*
	(0.058)		(0.058)	
District 7	0.221*	1.248*	0.220*	1.247*
	(0.056)		(0.056)	
Lake District	0.407*	1.502*	0.406*	1.500*
	(0.075)		(0.075)	
Constant	-0.242	0.785	-0.239	0.788
	(0.199)		(0.199)	
Observations	66,216		66,216	
Number of groups	502		502	

Standard errors in parentheses

* p<0.05

With hierarchical linear and generalized linear models, however, there are no model fit statistics that are effective estimators of the proportion of variance explained. Unfortunately, there currently is no analog for the R^2 or Pseudo R^2 that can be used in the models estimated here. The Pseudo R^2 for several models is reported below (see Table 38). The Pseudo R^2 denotes how much better the fully specified model (full model) is over the unconditional model. It does not tell us the percent of the variation explained, which is what a Pearson's R would do. On the face of it, the Pseudo R^2's for the models – with the exception of search and length of stop – seem low and suggest that these models do not adequately fit the models. Thus, given the low Pseudo R^2's and the unsuitability of Pseudo R^2 as a means of model fit, we need to assess model fit differently.

Table 38. The Pseudo R2 for Arrest, Search, Seizure, Length of Stop, and Stop Outcome Models

Outcome	Pseudo R^2
Length of Stop	0.351
Arrest	0.052
Search	0.543
Seizure	0.081
Citation	0.049

Table 39. Likelihood Ratio Tests for the Nested Models for Arrest, Search, Seizure, Length of Stop, and Stop Outcome Models

Outcome	Model 1: Situational Variables	Model 2: Adding Driver Variables	Likelihood Ratio Test Between Models 1 & 2	P-Value of Test
Arrest	95.223	291.352	212.332	0.000
Search	1506.81	1478.693	69.317	0.000
Citation	142.723	448.971	319.244	0.000
Length of Stop	20000	21000	198.067	0.000
Outcome	Model 2: Adding Driver Variables	Model 3: Adding Deputy Variables	Likelihood Ratio Test Between Models 2 & 3	P-Value of Test
Arrest	291.352	305.183	13.136	0.041
Search	1478.693	1481.878	6.482	0.371
Citation	448.971	461.131	13.069	0.042
Length of Stop	21000	21000	29.391	0.000
Outcome	Model 3: Adding Deputy Variables	Model 4: Adding Contextual Variables	Likelihood Ratio Test Between Models 3 & 4	P-Value of Test
Arrest	305.183	321.111	14.506	0.024
Search	1481.878	1491.719	10.409	0.108
Citation	461.131	514.097	57.021	0.000
Length of Stop	21000	21000	59.772	0.000

One way of assessing model fit is to examine whether the addition of variables to a model help with increased model fit. While this does not tell us model fit precisely, it does enable us to determine the effectiveness of additional variables in the model when predicting the outcome. This is accomplished by starting with a baseline model then adding variables. We would then compare the χ^2 for each model using a likelihood ratio test; if the model with the higher number of variables shows significant increases in the χ^2, then the new variables are a welcome addition to the model.

Table 39 shows the results of these tests. Each level in the table shows the addition of our sets of variables (i.e., situational, driver, deputy and contextual variables) and whether the likelihood ratio for the two models is significant. We conduct our nesting additional variables needed to test model fit in understandable groupings. We begin with only the situational variables in the model (Model 1), then add the driver variables (Model 2), next we add the deputy variables (Model 3) and finally we add the contextual variables (Model 4). Our likelihood ratio tests assess whether Model 2 is better than Model 1, Model 3 is better than Model 2, and finally if Model 4 is better than Model 3.

To begin with, we see that, regardless of the outcome, the addition of driver variables is a significant improvement in the models. Next, with the exception of search, the likelihood ratio tests show that adding the deputy variables to the model is an improvement over models with only situational and driver variables. Finally, with the exception of search, the likelihood ratio tests show that adding the contextual variables to the model is an improvement over models with only situational, driver variables, and deputy variables.

7. Summary of Results and Conclusion

The goal of the annual report is to evaluate the presence and extent of racially biased policing within the patrol function of the MCSO. First, we use TraCS data from July 1, 2016 through June 30, 2017 for much of the analysis. Second, we examine changes in outcomes across years by comparing the current data to two prior years of TraCS data from July 1, 2014 through June 30, 2015 and July 1, 2015 through June 30, 2016. Third, we use the MCSO personnel data on personal demographic characteristics (e.g. race, ethnicity, sex) and employment at the MCSO variables (e.g. hire date, rank) and merged it with the TraCS data via the deputy's serial number. Fourth and finally, we combine personnel data on deputy involvement in additional traffic enforcement details that are special assignments or grant activities with the above datasets to control for these types of traffic enforcement assignments.

Prior to analyzing the data we examined its quality. We found that over the past year the MCSO made significant progress in strengthening the quality of its data. Missing data and duplicates have been either eliminated or greatly reduced. All stops have useable geographic coordinates and can be linked to administrative and geographic boundaries. We encourage the MCSO to continue to improve its data collection and management.

Below we summarize our findings by providing the answers to our situating questions about the relationship between driver race/ethnicity and post-stop outcomes for deputy-initiated stops from 2016-2017 within the patrol function of the Maricopa County Sheriff's Office.

1. *Does descriptive, internal benchmarking identify any deputies who are engaging in policing behavior (i.e., arrest, search, seizures, and citations) towards racial/ethnic minority drivers that is markedly different from their similarly situated peers?*

   We find that a large number of deputies are flagged in the descriptive ratio analyses as potentially engaging in biased behavior towards racial/ethnic minority drivers. These deputies were conducting post-stop outcomes at a rate that was two times more common than other deputies making stops in the same district. This suggests a more complex and prevalent problem than simply an issue of biased policing clustered around a small number of deputies. Note though, when ratios are constructed off of small numbers of stops, there is an increased risk of false positives, or identifying deputies as engaging in problematic policing when there is not a pattern of such behavior. For stops or characteristics of stops that do not occur very often, such as incidental contacts or seizures, the number of stops that generate the ratio deserves careful consideration by the MCSO before high ratios (i.e., ratios over two) are turned into formal alerts.

2. *In the fiscal year of 2016-2017, are there racial/ethnic differences in post-stop outcomes within the patrol function of the MCSO?*

   Using inferential analyses, racial differences in post-stop outcomes are present across Native Americans, Blacks, and Hispanics. We focus on Hispanics here due to the context of the court order. All outcomes, namely, arrest, search, seizure, citation, and length of stop, show racial disparities in stops for Hispanics, net of controls. Hispanic drivers were 1.7 times more likely to be arrested and 1.4 times more likely to be searched than White drivers. Hispanic drivers were subject to longer stops on average, compared to Whites, even after accounting for situational stop characteristics and other controls. Note though, that across reporting years, the length of stop for Hispanics has been decreasing.

3. *Are deputies' assigned to traffic enforcement details associated with differences in post-stop outcomes across driver race/ethnicity, and if they are, how do those affects work?*

   The concern about deputies on traffic enforcement specialty assignments or grant work is related to deputies' exposure to different types of drivers and reduced discretion given the demands of their assignment. If traffic enforcement details put deputies at risk for being identified as engaging in problematic policing, then assignment to a traffic enforcement detail should be a consideration when weighing when to initiate a supervisory discussion for a deputy. We find that this is not the case. With the exception of citations and length of stop, additional traffic enforcement details such as special assignments and grant duty activities have no impact on the likelihood of post-stop outcomes. All special assignments increase the likelihood of writing a citation. The assignments of aggressive driving and click it or ticket lead to a shorter length of stop. Racial differences in post-stop outcomes remain across all outcomes even when including special assignment/grant work variables in the controls. Thus, traffic enforcement specialty assignments or grant work can be ruled out as an activity that impacts deputies' propensity to be identified as engaging in potentially problematic policing.

4. *If there is evidence of racial or ethnic bias in the above analyses, is it due to systemic bias within the patrol section of the MCSO or are the differential effects across race/ethnicity due to a few deputies who show a pattern of problematic behavior?*

   Through the ratio analyses, there were a large number of deputies that fell outside their district norms during traffic stops with minority drivers. The inferential models show that for the outcome arrest, search, and citation, there are no deputies who could be classified as deputies who show a pattern of problematic behavior, but rather that the issue is more systematic in nature. These results collectively suggest systemic bias within the patrol function of the MCSO, rather than the problem being concentrated among a few deputies showing patterns of problematic behavior.

5. *Are deputies who have been identified as engaging in potentially problematic behavior in the previous reporting years of 2014-2015 and 2015-2016 responsible for the differential race/ethnicity effects for arrest, search, citation and length of stop in 2016-2017, provided those differences exist?*

   Stops conducted by deputies who were flagged in 2014-2015 had an increased likelihood of arrest in the 2016-2017 data year than stops conducted by their non-flagged peers. Stops conducted by deputies who were flagged in 2015-2016 had a decreased likelihood of search when the driver was Hispanic. For citations and length of stop, while flagged deputies did not have a direct effect on Hispanic driver stop outcomes, accounting for them in the model appeared to account for differences in Hispanic citation rates as well as length of stop. In sum, the results show that for the current year, previously flagged deputies have effects on the likelihood of some post-stop outcomes. But this is not a universal finding across all outcomes, leading to the conclusion that while previously flagged deputies do have an effect on current outcomes, these deputies are not wholly responsible for the racial differences seen in this years' data and results.

6. *Have the differential race/ethnicity effects changed over time? More specifically, do the differential race/ethnicity effects found in years 2014-2015 and 2015-2016 continue into 2016-2017, and if they do, are the 2016-2017 race/ethnicity effects different in size and direction than years previous?*

For arrests and searches, there is no change across all reporting years in Hispanics' increased likelihood of being arrested or searched. However, as was reported last year, Hispanics continually see a decrease in their length of stops. While the gap between Hispanic and White drivers in regards to length of stop has not closed, it is getting narrower over time. Also, this year we saw that once taking into consideration the reduction in the likelihood of citations over time, Hispanic drivers were no different than White drivers in their likelihood of receiving a citation. Again, while the difference in post-stop outcomes remain in the 2016-2017 reporting year, over time the differential between Hispanics and Whites for the outcomes of length of stop and citation are improving.

In sum, when examining these results collectively, an important pattern emerges that suggests the issue of racial differences in post-stop outcomes is a problem for all deputies participating in the MCSO's patrol function and cannot be solved by removing a select few deputies engaged in the worst racially biased patterns of behavior. That said, there have been improvements in reducing the higher likelihood of Hispanics being cited (when compared with Whites) over time. Moreover, Hispanics have seen a reduction in their overall length of stop in the past year. Together this is showing forward moving in reducing disparities in post-stop outcomes over time.

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Appendix A. Redefining Comparable Peers to Include the Time of Day

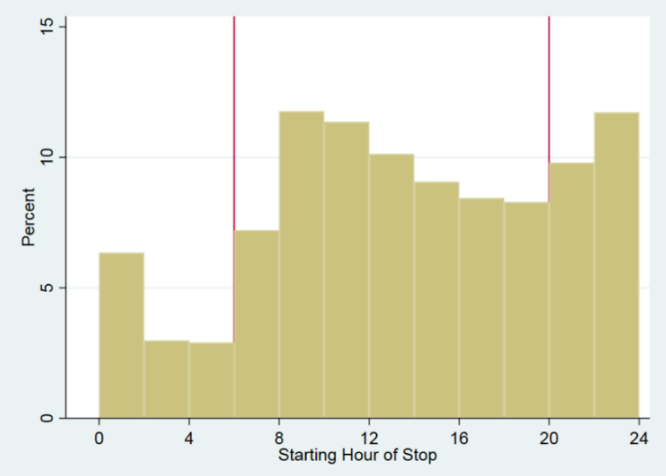
As discussed in the section "Internal Benchmarking with Basic and Descriptive Statistics," the ratio analyses that are used to identify potentially problematic policing among deputies do so by contrasting one deputy's stop patterns to that of their comparable peers, or those deputies making stops in the same district. Comparable peers can be defined in a number of different ways: peers can be seen as deputies that share the same daily assignment, those assigned to the same patrol car, or deputies working a similar shift, those that make stops in the same administrative boundaries, or a combination of these things.

Feedback from deputies engaged in patrol activities noted their concerns about which deputies to whom they believe they should be compared. Deputies working the night shift feel that the stops they conduct are different due to traffic patterns and other types of activities, and therefore should not be compared to deputies working a day shift. To be responsive to this feedback, together ASU and the MCSO made an effort to find an alternative definition of comparable peers that is in line which what deputies experience in the field.

To do this, we defined comparable peers as those deputies working in the same district at the same time of day as the focal deputy. Within the policing literature, comparable peers are often considered individuals who work in the same area, squad or during the same shift (Ingram et al., 2013). Currently, the MCSO does not routinely capture squad information that is able to be attached to the deputy-initiated traffic stop data used for the annual report. Moreover, the hours that constitute the day and night shift assignments vary across districts; thus, using the MCSO's shift designations would likely lead to faulty comparisons. Thus, to create the closest estimation of shift and assignment, we chose to compare deputies to other deputies who made stops in the same district at approximately the same time of day.

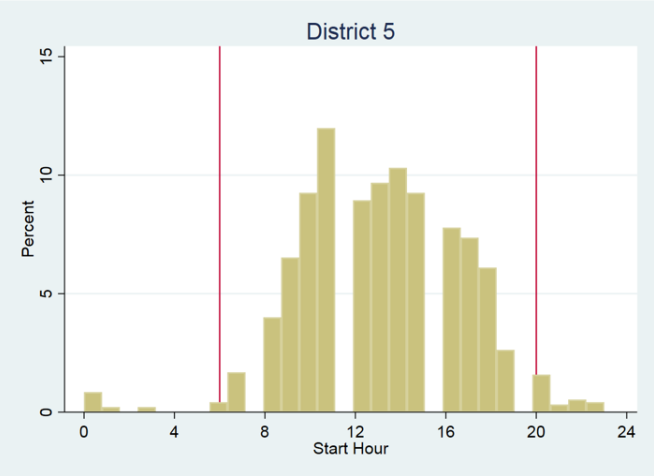
To do this, we began by examining the distribution of the start hour for stops. Figure 1 shows the distribution of the start hour of stops for all stops in the data. There appeared to be natural breaks in the distribution: the red lines shown in Figure 1 mark what hours the time of day variable would represent. The time of stop variable is a categorical variable with three categories: early morning (12 a.m. to 5:59 a.m.), midday (6 a.m. to 8:59 p.m.), and nighttime (9 p.m. to 11:59 p.m.). As such, by using both district and time of day in these analyses, comparable peers are deputies working in the same district and at the same time as the focal deputy. While this is not a perfect approximation of shift, the time of day variables do account for similarity of conditions that deputies experience.

Figure 1. A Histogram of the Stops Start Time



The results of these analyses, in full, are not shown in the report. While conceptually, they capture what they are intended to, pragmatically, for a number of reasons, they are not useful for identifying deputies possibly engaged in biased policing. First, when constructing the ratios when the unit of analysis is a combination of deputy, district, race of driver, type of stop, and time of

Figure 2. A Histogram of Start Times for All Stops in District 5

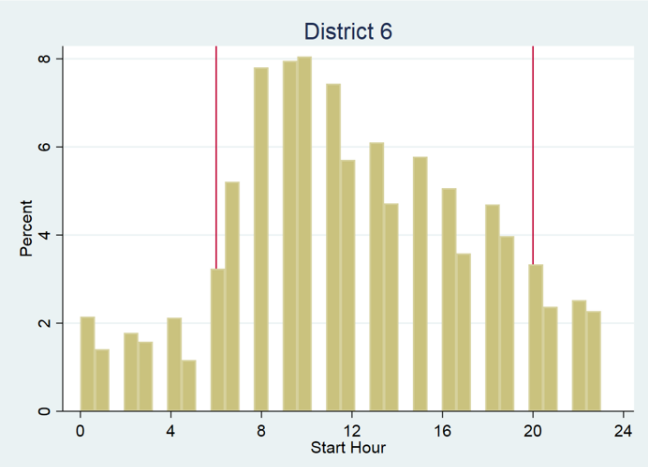


day, there are circumstances where there are very few stops that qualify to be in the analysis. For clarity, here is an example. Arrests, searches, seizures and incidental contacts are all less common than citations and warnings. Imagine a circumstance where the ratio represents a comparison of a particular deputy to the district level of arrests of Native American drivers in District 6 during the hours of 12am to 5:59am. There would be very few cases like this at the district level making it very difficult to adequately compare deputies.

Next, the secondary consequence of having small stop numbers is inflated ratio for deputies. Continuing with the above example, there are 33 arrests made in District 6 during the hours of 12am to 5:59am. Only one of those arrests was of a Native American driver. Remember that a ratio for a particular deputy is constructed by putting the deputy's percentage for that particular stop/race/district/time of day combination in the numerator, and then dividing by the district percentage for that particular stop/race/district/time of day combination. If we construct the ratio for the deputy (we will call them Deputy B from here on out) who made the single arrest of the Native American driver in District 6 during the hours of 12am to 5:59am, Deputy B made six other arrests. The numerator for the ratio would be 0.1667 (i.e., 1/6 or 0.1667). The denominator would then be 0.0303 (i.e., 33 arrests in District 6 during the hours of 12am to 5:59am with 1 being of a Native American driver). Thus, the ratio for Deputy B would be 0.1667/0.0303 or 5.502. Deputy B would subsequently be flagged for conducting the sole arrest of a Native American in District 6 during the hours of 12am to 5:59am. One stop does not, and should not, constitute a pattern of problematic policing.

Third, inflated ratios, like the one above, would be much more common if time of day was added to the unit of analyses, resulting in more frequent flags that are effectively false positives. The TSAR process of selecting which deputies are to receive supervisory discussions discounts ratios over 2 that are based on small numbers of stops. If time of day was added to the unit of analyses when constructing ratios, the TSAR process would be elongated and would have to account for a larger number of false positives.

Figure 3. A Histogram of Start Times for All Stops in District 6



Lastly, an important concern brought forth by the MCSO was that the above time categories may not correspond to the distribution of start times for districts. Upon further examination, some districts do have different distributions of the start hour of stops. As examples, the distributions of the start hour of stops in Districts 5 and 6 are shown in Figures 2 and 3; the red lines represent the time of day categories created from the full distribution of stops. In Districts 5 and 6, those categories do not capture what is happening in the districts. To do this properly, each district would have its own time of day categories, which would exacerbate the existing problem of too few stops.

Table 1. Descriptive Statistics of Stop Patterns Regarding District-Level Differences by Race and Deputy-Time of Day Comparisons

	Number by race distribution	% by race distribution	Number of Non-Duplicate Deputies Making Stops by Race	Number of Non-Duplicate Deputies With a Ratio Over 2
Incidental Contact				
From 12:00am to 5:59am				
White	7	53.846	7	2
Native American	1	7.692	1	1
Hispanic	3	23.077	2	1
Black	1	7.692	1	0
Asian	1	7.692	1	1
From 6:00am to 8:59pm				
White	49	62.025	37	3
Native American	-	-	-	-
Hispanic	22	27.848	18	13
Black	7	8.861	7	5
Asian	1	1.266	1	1
From 9pm to 11:59pm				
White	7	53.846	7	2
Native American	-	-	-	-
Hispanic	4	30.769	4	4
Black	-	-	-	-
Asian	2	15.385	2	2
Warning				
From 12:00am to 5:59am				
White	898	63.508	152	15
Native American	15	1.061	12	10
Hispanic	338	23.904	100	35
Black	129	9.123	65	32
Asian	34	2.405	26	20
From 6:00am to 8:59pm				
White	4269	69.972	291	12
Native American	43	0.705	32	27
Hispanic	1199	19.653	212	60
Black	445	7.294	150	61
Asian	145	2.377	90	52
From 9pm to 11:59pm				
White	1427	67.058	191	9
Native American	22	1.034	18	16
Hispanic	467	21.945	137	34
Black	166	7.801	91	54
Asian	46	2.162	38	32
Citation				
From 12:00am to 5:59am				
White	704	55.216	140	11
Native American	19	1.490	16	11
Hispanic	378	29.647	109	43
Black	146	11.451	60	28
Asian	28	2.196	21	18
From 6:00am to 8:59pm				
White	6429	67.709	267	14
Native American	122	1.285	59	35
Hispanic	2105	22.170	209	59
Black	642	6.761	150	60
Asian	197	2.075	97	52
From 9pm to 11:59pm				
White	982	59.157	156	10
Native American	14	0.843	10	9
Hispanic	454	27.349	124	43
Black	166	10.000	78	34
Asian	44	2.651	30	21

Below, take a more thorough look at constructing ratios with the inclusion of the time of day in the unit of analysis. We restrict our analyses to the time of day categories for the entire distribution of stops. More specifically, we look at the ratios for incidental contact, warnings, and citations. These results demonstrate the above issues and show why these analyses are inappropriate for generating deputy alerts. Table 1 shows the descriptive statistics regarding overall percentages of the type of stop (incidental contact, warning, and citation) by driver race/ethnicity and time of day (early morning = 12 a.m. to 5:59 a.m., midday = 6 a.m. to 8:59 p.m. and nighttime = 9 a.m. to 11:59 p.m.), which are compared to deputy performance on the ratios associated with those outcomes.

Notable percentages are presented. Starting with incidental contact traffic stops, it is important to note that incidental contact stops are uncommon, and are even more rare when split across time categories. While the percentages in column "Percent of Non-Duplicate Deputies With a Ratio Over 2" are high (some are as high as 100%), they are based on only a few stops. For instance, there are six circumstances where there are two or fewer deputies conducting incidental contact stops by a particular race; these circumstances result in nearly all deputies who conducted these stops being flagged.

Next, for traffic stops resulting in warnings or citations, there appears to be some time of day patterns to when deputies are more likely to be flagged. For instance, 35% of deputies who give Hispanics warnings in the early morning hours are flagged compared to 24.8% of deputies giving warnings in the nighttime hours. This suggests that warnings for Hispanic drivers are not as common in the morning. Approximately 59.3% of deputies who give Blacks warnings in the nighttime are flagged compared to 40.6% of deputies who give warnings to Blacks during midday.

Lastly in Table 1, for traffic stops that result in a citation, during the early morning, 46.7% and 85.7% of deputies have ratios that are two times higher than the district average involving citations for Black and Asian drivers. Thus, when citations are given during this time for Blacks and Asians, this pattern seems to be drastically different than the organizational norm within districts at that time of day. Also, notably, for deputies who give Asians drivers citations during the nighttime hours, 70% of these deputies are flagged. This sits in stark contrast with the 53.6% of deputies who receive flags for giving citations to Asians during midday.

For all types of traffic stops presented here – incidental contact, warning, and citation – the inclusion of time of day in the analyses almost unilaterally produces very high percentages of deputies who are being flagged. Keep in mind that warnings and citations are the most common types of stop within this data year. Thus, even when examining these patterns within the most frequent types of stops, there is a higher potential for inflated ratios and increased flagging of deputies based on small numbers of stops. The original intent of this analysis was to be more responsive to deputies' concerns about whom they are being compared. While this analysis makes a viable comparison, it does so at an increased cost of flagging deputies who do not conduct enough stops to represent a viable pattern of behavior. This would be just as concerning to deputies as using the correct comparison. Consequently, it is ASU's recommendation that different means of capturing comparable peers be used in the future and that the MCSO does not use the ratios with the time of day included in the unit of analyses as a means of flagging deputies.

Appendix B. Type of Stop – Citations, Deputy-District Comparison Ratio

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
28	District 3	11	5	0.911	0.000	1.722	0.000	0.000
36	District 1	25	13	0.524	3.778	1.504	2.177	0.000
371	District 1	24	16	1.277	0.000	0.244	1.769	0.000
371	District 2	1	1	0.000	0.000	0.000	8.044	0.000
371	District 3	8	3	1.518	0.000	0.000	0.000	0.000
371	District 4	13	9	1.196	0.000	0.000	0.000	0.000
371	Lakes District	22	14	1.070	0.000	0.347	0.000	9.532
371	District 7	2	2	0.613	0.000	0.000	14.821	0.000
483	District 7	77	26	0.801	1.405	1.233	5.700	0.000
516	District 4	17	10	1.076	0.000	0.897	0.000	0.000
537	District 1	9	6	0.284	0.000	2.607	1.573	0.000
537	Lakes District	2	2	1.362	0.000	0.000	0.000	0.000
692	District 1	13	4	0.851	0.000	0.000	2.359	8.186
692	District 6	103	63	0.964	0.000	0.920	1.725	1.116

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
941	District 7	113	6	0.817	6.089	1.781	0.000	0.000
996	District 2	39	25	1.345	0.000	0.756	0.644	1.619
1561	District 2	45	17	1.130	0.000	0.833	0.946	2.381
1907	District 2	1	1	2.401	0.000	0.000	0.000	0.000
2041	District 7	42	25	1.029	1.461	0.855	0.000	1.366
2306	District 3	60	7	0.434	0.000	2.459	0.000	7.084
2539	District 3	160	66	1.196	0.000	0.522	1.121	0.000
2553	District 2	74	36	1.134	0.000	0.656	2.011	0.000
2571	Lakes District	2	2	0.681	0.000	2.430	0.000	0.000
2618	District 1	30	7	0.730	0.000	1.117	2.696	0.000
2949	District 1	4	3	1.135	0.000	0.000	3.145	0.000
2949	District 3	40	20	1.214	0.000	0.215	1.233	2.479
2953	District 3	73	17	0.982	0.000	0.506	2.176	2.917
2969	District 1	5	3	1.702	0.000	0.000	0.000	0.000
2977	District 2	67	26	0.554	10.508	1.181	0.928	1.557
3069	District 7	79	54	0.908	2.030	1.187	1.098	1.897
3074	District 1	83	68	1.127	1.445	0.863	0.555	0.963
3074	District 3	2	1	0.000	0.000	0.000	12.330	0.000
3074	District 4	2	1	1.196	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
3074	Lakes District	75	40	1.021	0.000	0.972	1.529	0.000
3074	District 6	8	8	1.380	0.000	0.000	0.000	0.000
3074	District 7	2	2	1.225	0.000	0.000	0.000	0.000
3076	District 1	51	27	0.820	0.000	1.159	1.048	3.638
3076	District 4	7	6	0.598	0.000	2.989	5.210	0.000
3076	Lakes District	111	98	0.931	1.664	1.141	0.936	2.043
3248	District 1	20	6	0.851	0.000	1.304	1.573	0.000
3326	District 7	44	26	1.037	0.000	0.822	0.000	2.627
3439	District 2	88	83	0.839	1.097	1.053	1.163	1.951
3466	District 2	25	11	0.218	0.000	1.503	0.731	7.359
3466	District 6	4	2	1.380	0.000	0.000	0.000	0.000
3487	District 2	20	10	0.720	0.000	0.944	1.609	4.048
3506	District 2	31	2	0.000	0.000	2.361	0.000	0.000
3587	District 6	33	3	0.920	0.000	0.000	5.174	0.000
3604	District 1	40	7	1.216	0.000	0.559	1.348	0.000
3604	District 6	1	1	1.380	0.000	0.000	0.000	0.000
3704	District 4	39	10	0.957	0.000	1.793	0.000	0.000
3746	District 3	31	17	0.803	0.000	1.772	0.725	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
3832	District 1	11	3	1.135	0.000	0.000	3.145	0.000
3832	District 2	82	35	0.617	0.000	1.282	1.609	0.000
3832	District 3	5	4	1.138	0.000	1.076	0.000	0.000
3832	District 4	3	3	0.797	0.000	0.000	0.000	22.792
3911	District 1	50	49	0.730	0.000	1.117	2.311	1.337
3937	District 2	12	12	1.601	0.000	0.590	0.670	0.000
3937	District 3	13	11	0.966	0.000	1.174	1.121	0.000
3937	Lakes District	3	3	0.000	0.000	4.861	0.000	0.000
3983	District 1	9	5	1.021	0.000	0.782	0.000	6.549
3983	District 4	2	1	1.196	0.000	0.000	0.000	0.000
4277	District 2	21	17	1.554	5.357	0.694	0.000	0.000
4299	District 2	482	307	1.017	0.890	0.977	1.101	0.659
4299	District 3	2	1	1.518	0.000	0.000	0.000	0.000
4497	District 7	296	157	0.983	0.233	1.157	1.510	1.088
4542	District 1	24	20	1.021	2.456	1.173	0.000	1.637
4542	District 6	138	110	1.029	0.000	0.719	1.411	1.917
4700	District 1	8	2	1.702	0.000	0.000	0.000	0.000
4700	District 2	34	15	1.121	0.000	1.102	0.536	0.000
4700	District 3	201	69	0.946	1.945	1.060	1.072	1.437

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
4700	District 4	3	1	0.000	0.000	8.967	0.000	0.000
4700	Lakes District	27	14	1.167	5.825	0.347	0.000	0.000
4926	District 6	10	2	1.380	0.000	0.000	0.000	0.000
5266	District 3	33	6	0.759	0.000	2.152	0.000	0.000
5293	District 6	9	8	0.863	0.000	1.977	0.000	0.000
5502	District 3	21	7	1.301	0.000	0.000	0.000	7.084
5529	District 1	11	6	0.851	8.186	0.000	3.145	0.000
5714	District 2	77	40	0.900	0.000	1.299	0.603	0.000
5947	District 1	20	9	0.946	0.000	1.738	0.000	0.000
5947	District 2	4	2	2.401	0.000	0.000	0.000	0.000
5947	District 6	1	1	0.000	0.000	5.271	0.000	0.000
6062	District 1	6	5	1.021	0.000	0.782	0.000	6.549
6062	District 6	50	38	1.090	0.000	0.832	0.817	0.000
6170	District 1	115	45	0.946	2.183	1.043	1.048	0.728
6223	District 4	8	2	1.196	0.000	0.000	0.000	0.000
6233	District 1	12	9	0.757	0.000	0.869	2.097	3.638
6233	District 6	44	16	0.949	0.000	0.659	1.940	4.392
6244	District 2	78	68	1.095	0.000	0.868	1.183	1.190
6244	District 3	38	33	1.288	0.000	0.652	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
6244	District 4	5	3	0.797	0.000	2.989	0.000	0.000
6244	Lakes District	11	8	0.511	0.000	2.430	3.823	0.000
6308	District 1	6	2	0.851	0.000	1.956	0.000	0.000
6308	Lakes District	3	2	0.681	0.000	0.000	0.000	33.364
6308	District 6	3	1	1.380	0.000	0.000	0.000	0.000
6325	District 1	10	4	1.702	0.000	0.000	0.000	0.000
6325	District 6	12	8	1.035	0.000	1.318	0.000	0.000
6619	District 3	12	4	1.138	0.000	1.076	0.000	0.000
6951	District 1	13	9	0.946	5.458	0.869	1.048	0.000
6951	District 2	2	2	1.201	0.000	0.000	4.022	0.000
6951	District 4	17	13	0.828	0.000	1.380	2.404	5.260
7060	District 2	5	1	2.401	0.000	0.000	0.000	0.000
7060	District 3	4	2	1.518	0.000	0.000	0.000	0.000
7060	District 4	215	119	0.975	1.532	1.281	1.051	0.000
7060	Lakes District	71	41	1.129	0.000	0.711	0.746	0.000
7070	District 2	56	15	0.480	0.000	1.889	0.000	0.000
7274	District 1	27	9	0.946	0.000	1.304	1.048	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
7274	District 6	281	106	0.964	2.652	1.144	0.586	1.989
7309	District 2	136	68	1.518	0.000	0.521	1.183	0.000
7309	District 3	178	121	1.217	0.000	0.640	0.509	0.410
7309	District 4	9	5	0.957	0.000	1.793	0.000	0.000
7309	Lakes District	45	31	0.835	0.000	1.725	0.987	0.000
7323	District 1	9	8	0.638	6.140	0.000	3.538	4.093
7337	District 1	2	2	1.702	0.000	0.000	0.000	0.000
7337	District 4	73	33	1.087	0.000	0.543	0.000	2.072
7559	District 2	4	1	2.401	0.000	0.000	0.000	0.000
7682	District 2	69	37	1.038	4.923	0.957	0.870	0.000
7696	District 1	4	2	1.702	0.000	0.000	0.000	0.000
7696	District 6	68	50	1.049	0.000	0.527	1.863	1.406
7750	District 3	15	3	0.506	0.000	2.869	0.000	0.000
7872	District 2	181	130	1.330	0.701	0.726	0.990	0.311
7872	District 3	31	22	1.173	0.000	0.783	0.000	2.254
7872	District 4	3	1	0.000	0.000	8.967	0.000	0.000
7883	District 3	26	3	0.000	0.000	4.304	0.000	0.000
7918	District 2	129	50	0.816	1.821	1.275	0.644	0.810
7980	District 3	22	5	1.214	0.000	0.861	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
7984	District 2	1	1	0.000	0.000	2.361	0.000	0.000
7984	District 3	7	5	0.911	0.000	1.722	0.000	0.000
7984	District 4	6	5	1.196	0.000	0.000	0.000	0.000
7984	Lakes District	3	3	0.908	0.000	0.000	10.194	0.000
7994	District 6	6	2	1.380	0.000	0.000	0.000	0.000
8091	District 4	7	2	1.196	0.000	0.000	0.000	0.000
8091	District 7	156	135	0.980	0.812	0.712	1.976	1.518
8161	District 1	6	4	1.277	0.000	0.978	0.000	0.000
8161	District 2	4	3	0.000	0.000	1.574	0.000	13.492
8161	District 3	9	5	0.304	26.835	2.582	0.000	0.000
8161	District 4	8	6	0.996	0.000	1.495	0.000	0.000
8161	District 6	1	1	0.000	0.000	5.271	0.000	0.000
8189	District 1	17	9	0.757	10.915	1.304	0.000	0.000
8257	Lakes District	3	1	0.000	0.000	4.861	0.000	0.000
8265	District 1	17	11	1.083	0.000	1.067	0.858	0.000
8265	District 2	31	21	1.143	0.000	1.124	0.000	1.927
8598	District 2	27	17	0.989	0.000	0.556	2.839	0.000
8729	District 1	4	1	0.000	0.000	3.911	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
8729	District 2	5	2	1.201	0.000	1.181	0.000	0.000
8729	District 3	32	22	1.104	0.000	0.783	0.560	2.254
8729	District 4	5	4	0.897	0.000	2.242	0.000	0.000
8729	Lakes District	31	28	0.875	0.000	1.389	1.092	2.383
8750	District 3	22	11	1.104	0.000	0.391	1.121	4.508
8757	District 1	3	1	1.702	0.000	0.000	0.000	0.000
8874	District 1	8	6	0.851	0.000	1.956	0.000	0.000
8874	District 6	128	81	1.022	0.000	1.106	0.383	1.735
8898	District 1	14	3	1.135	0.000	0.000	3.145	0.000
8921	District 2	13	2	1.201	0.000	1.181	0.000	0.000
8936	District 2	17	8	1.201	0.000	0.885	0.000	5.060
8960	District 1	68	13	1.571	0.000	0.301	0.000	0.000
8960	District 6	17	1	1.380	0.000	0.000	0.000	0.000
8997	District 1	1	1	1.702	0.000	0.000	0.000	0.000
8997	District 2	31	9	0.534	0.000	1.574	0.894	0.000
8997	District 3	28	19	0.959	0.000	1.133	1.298	0.000
9058	District 1	83	40	1.021	1.228	0.782	1.651	0.000
9132	District 1	12	7	1.459	0.000	0.559	0.000	0.000
9132	District 6	104	34	1.177	0.000	0.620	0.457	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
9316	District 1	108	46	0.851	1.068	1.445	0.615	1.424
9329	District 7	51	28	1.007	0.000	1.145	0.000	2.439
9360	District 2	79	35	0.686	0.000	1.484	0.689	0.000
9453	District 3	65	10	0.607	0.000	2.152	1.233	0.000
9585	District 3	1	1	1.518	0.000	0.000	0.000	0.000
10080	District 2	26	7	2.058	0.000	0.337	0.000	0.000
10088	District 1	1	1	0.000	0.000	0.000	9.435	0.000
10088	Lakes District	2	2	1.362	0.000	0.000	0.000	0.000
10280	District 7	100	89	0.964	0.411	1.321	1.998	0.384
10303	District 1	2	1	1.702	0.000	0.000	0.000	0.000
10303	District 3	21	15	1.315	0.000	0.574	0.000	0.000
10303	District 4	9	5	0.957	0.000	1.793	0.000	0.000
10303	Lakes District	7	6	1.135	0.000	0.810	0.000	0.000
10318	District 2	16	8	0.000	0.000	1.181	3.017	5.060
10719	District 4	60	17	1.196	0.000	0.000	0.000	0.000
10809	District 3	55	24	0.443	5.591	2.331	1.027	2.066
10821	District 1	71	44	1.315	0.000	0.622	0.643	0.000
10996	District 3	31	7	1.084	0.000	0.000	1.761	7.084

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
11010	District 1	58	32	0.692	1.535	1.467	1.769	0.000
11010	Lakes District	10	10	1.226	0.000	0.486	0.000	0.000
11019	District 2	5	3	1.601	0.000	0.787	0.000	0.000
11088	District 6	21	9	0.920	0.000	0.000	3.449	7.809
11205	District 3	113	66	0.736	0.000	1.695	1.495	0.000
11234	District 1	42	38	1.344	0.000	0.823	0.000	0.000
11234	District 4	1	1	0.000	0.000	0.000	31.257	0.000
11234	Lakes District	108	103	1.137	0.792	0.708	0.297	0.000
11234	District 6	13	13	1.168	0.000	0.811	0.000	0.000
11511	District 1	18	13	1.048	0.000	0.903	1.452	0.000
11511	District 2	1	1	2.401	0.000	0.000	0.000	0.000
11511	District 4	5	3	0.797	0.000	2.989	0.000	0.000
11511	Lakes District	4	4	1.021	0.000	1.215	0.000	0.000
11625	District 3	153	49	1.022	0.000	0.966	1.007	1.012
11692	District 4	137	70	1.059	0.000	0.769	0.000	1.954
11714	District 2	10	8	2.101	0.000	0.295	0.000	0.000
11714	District 3	18	16	1.138	0.000	0.538	0.771	3.099

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
11714	District 4	22	17	1.125	0.000	0.527	0.000	0.000
11714	Lakes District	11	8	0.851	0.000	1.215	3.823	0.000
11753	District 3	87	41	0.888	0.000	1.470	0.902	0.000
11826	District 4	4	1	1.196	0.000	0.000	0.000	0.000
11849	District 2	183	162	1.141	2.249	1.006	0.397	0.999
11869	District 1	5	2	0.851	0.000	1.956	0.000	0.000
11869	District 6	84	42	1.052	0.000	0.753	1.478	0.000
12042	District 1	9	1	1.702	0.000	0.000	0.000	0.000
12044	District 3	84	33	1.058	0.000	1.043	0.747	0.000
12069	District 2	9	2	0.000	0.000	2.361	0.000	0.000
12138	District 3	75	22	1.173	0.000	0.391	1.681	0.000
12153	District 1	10	7	0.973	0.000	0.559	2.696	0.000
12153	District 6	63	45	0.797	0.000	1.406	2.070	1.562
12375	District 2	35	25	0.768	0.000	0.944	1.931	1.619
12418	District 2	17	7	1.372	0.000	0.337	2.298	0.000
12495	District 1	7	4	1.702	0.000	0.000	0.000	0.000
12495	District 2	3	3	2.401	0.000	0.000	0.000	0.000
12495	District 3	11	7	1.518	0.000	0.000	0.000	0.000
12495	District 4	54	40	0.986	4.558	0.673	1.563	1.709

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
12495	Lakes District	13	12	0.908	0.000	1.620	0.000	0.000
12514	District 2	54	22	1.091	0.000	1.073	0.731	0.000
12735	District 1	10	3	1.702	0.000	0.000	0.000	0.000
12735	District 3	2	1	1.518	0.000	0.000	0.000	0.000
12735	District 4	8	1	1.196	0.000	0.000	0.000	0.000
12735	District 7	71	32	0.957	1.142	0.668	0.926	3.202
13113	District 2	1	1	2.401	0.000	0.000	0.000	0.000
13113	District 7	115	99	1.040	0.738	1.187	0.599	0.000
13135	District 1	5	4	1.277	0.000	0.978	0.000	0.000
13135	District 2	3	1	0.000	0.000	2.361	0.000	0.000
13159	District 1	62	52	1.277	0.945	0.752	0.363	0.000
13159	District 2	11	10	1.201	9.107	0.944	0.000	0.000
13159	District 3	3	3	1.518	0.000	0.000	0.000	0.000
13159	District 4	107	104	1.000	1.753	0.862	0.902	1.972
13159	Lakes District	125	116	1.033	1.406	0.880	1.318	0.000
13159	District 7	65	60	0.919	0.000	1.959	0.988	1.138
13160	District 2	8	3	0.800	0.000	1.574	0.000	0.000
13160	District 3	9	3	1.518	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
13331	District 1	25	15	0.454	0.000	1.564	1.258	6.549
13331	District 2	12	4	0.000	0.000	1.181	4.022	0.000
13331	District 3	254	88	0.862	0.000	0.978	2.382	0.563
13331	District 4	5	3	1.196	0.000	0.000	0.000	0.000
13558	District 2	18	5	0.480	0.000	1.889	0.000	0.000
13579	District 3	38	3	0.506	0.000	1.435	4.110	0.000
13722	District 1	32	15	1.248	0.000	0.521	1.258	0.000
13722	District 2	175	131	1.155	0.695	0.847	1.167	0.309
13722	District 3	5	5	0.607	0.000	0.861	4.932	0.000
13722	District 4	13	11	0.870	0.000	1.630	2.842	0.000
13946	District 3	18	8	0.949	0.000	1.614	0.000	0.000
14200	District 2	4	4	0.600	0.000	1.181	2.011	0.000
14241	District 2	178	162	1.067	0.000	1.137	0.447	0.750
14271	District 4	34	10	1.076	0.000	0.897	0.000	0.000
14298	District 7	2	2	1.225	0.000	0.000	0.000	0.000
14505	District 7	98	56	1.072	1.957	0.763	0.000	0.000
14604	District 3	15	4	1.138	0.000	1.076	0.000	0.000
14711	District 1	72	29	0.587	0.000	1.483	2.277	1.129
14730	District 1	203	161	1.100	0.305	1.069	0.527	0.610

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14730	District 6	897	739	0.969	0.951	1.134	0.903	1.236
14772	District 1	8	1	0.000	0.000	3.911	0.000	0.000
14772	District 3	6	1	1.518	0.000	0.000	0.000	0.000
14941	District 2	112	62	0.775	2.938	1.142	1.038	1.306
14965	District 3	1	1	0.000	0.000	4.304	0.000	0.000
15221	District 2	31	7	1.029	0.000	1.349	0.000	0.000
15326	District 1	6	6	1.419	0.000	0.652	0.000	0.000
15326	District 6	230	188	1.035	0.748	0.869	1.238	0.000
15755	District 3	8	2	0.759	0.000	2.152	0.000	0.000
15755	District 4	15	9	1.063	0.000	0.996	0.000	0.000
15760	District 1	34	21	1.054	0.000	0.559	1.348	3.119
15760	District 6	115	57	0.969	0.000	0.925	1.634	1.233
15761	District 1	69	30	0.965	1.637	1.304	0.315	1.092
15820	District 2	1	1	0.000	0.000	0.000	8.044	0.000
15820	District 4	18	4	1.196	0.000	0.000	0.000	0.000
15899	District 2	1	1	0.000	0.000	2.361	0.000	0.000
15899	District 4	2	2	1.196	0.000	0.000	0.000	0.000
16293	District 2	23	20	1.201	0.000	0.826	0.804	2.024
16369	District 4	4	2	1.196	0.000	0.000	0.000	0.000

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16369	District 7	188	92	1.172	0.000	0.116	0.000	1.114
16431	District 1	20	4	1.702	0.000	0.000	0.000	0.000
16431	District 6	46	13	1.168	0.000	0.000	2.388	0.000
16474	District 3	99	51	1.042	0.000	0.928	0.967	0.972
16553	District 2	3	1	0.000	0.000	2.361	0.000	0.000
16553	District 3	3	1	0.000	0.000	4.304	0.000	0.000
16563	District 2	31	10	0.480	0.000	1.417	0.804	4.048
16667	District 1	9	6	1.135	0.000	0.652	1.573	0.000
16687	District 3	48	16	0.949	0.000	0.807	0.000	9.298
16690	District 4	172	67	1.035	0.000	0.803	0.467	2.041
16905	District 2	46	6	1.601	0.000	0.394	0.000	6.746
16996	District 2	82	49	1.470	0.000	0.675	0.492	1.652
17071	District 3	47	20	1.062	0.000	1.076	0.616	0.000
17217	District 3	452	287	0.825	2.805	1.230	1.547	1.209
17295	District 1	15	13	1.179	0.000	0.903	0.726	0.000
17295	Lakes District	12	9	1.059	0.000	0.540	3.398	0.000
17295	District 6	5	5	1.380	0.000	0.000	0.000	0.000
17433	District 1	71	48	0.709	0.000	1.711	1.179	0.682
17456	District 1	9	5	0.681	0.000	0.782	1.887	6.549

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17456	District 4	16	10	0.957	18.233	0.000	3.126	0.000
17456	District 7	158	131	0.926	2.510	0.897	1.358	1.564
17464	District 1	23	11	0.929	0.000	1.778	0.000	0.000
17464	District 6	42	9	0.767	0.000	2.343	0.000	0.000
17534	District 1	2	2	1.702	0.000	0.000	0.000	0.000
17534	District 4	8	6	1.196	0.000	0.000	0.000	0.000
17629	District 1	1	1	1.702	0.000	0.000	0.000	0.000
17800	District 1	9	4	0.851	12.279	0.978	0.000	0.000
17800	District 2	35	26	1.108	0.000	0.636	2.166	0.000
17800	District 3	31	29	0.890	0.000	1.336	1.275	0.000
17800	District 4	17	14	1.110	0.000	0.641	0.000	0.000
17800	Lakes District	16	9	0.605	0.000	2.160	3.398	0.000
17800	District 7	1	1	1.225	0.000	0.000	0.000	0.000
17809	District 2	14	6	0.400	0.000	1.574	0.000	6.746
17842	District 1	22	15	1.362	0.000	0.261	0.629	2.183
17842	Lakes District	11	8	1.192	10.194	0.000	0.000	0.000
17997	District 1	17	2	0.851	0.000	1.956	0.000	0.000
17997	District 6	121	12	0.690	11.713	2.196	0.000	0.000

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18131	District 2	1	1	2.401	0.000	0.000	0.000	0.000
18131	District 3	32	24	1.454	0.000	0.179	0.000	0.000
18131	Lakes District	9	8	1.192	0.000	0.000	0.000	8.341
18247	District 1	13	1	0.000	0.000	3.911	0.000	0.000
18340	District 1	4	2	1.702	0.000	0.000	0.000	0.000
18340	District 2	3	1	2.401	0.000	0.000	0.000	0.000
18340	District 3	1	1	0.000	0.000	0.000	0.000	49.587
18340	District 4	4	2	1.196	0.000	0.000	0.000	0.000
18340	Lakes District	5	4	0.681	0.000	2.430	0.000	0.000
18521	District 4	59	45	1.010	0.000	0.996	1.389	0.000
18530	District 2	19	1	0.000	91.071	0.000	0.000	0.000
18532	District 3	1	1	1.518	0.000	0.000	0.000	0.000
18561	District 4	1	1	1.196	0.000	0.000	0.000	0.000
18561	District 7	39	30	1.021	2.436	1.069	0.000	0.000
18667	District 4	11	2	1.196	0.000	0.000	0.000	0.000
18930	District 6	38	2	1.380	0.000	0.000	0.000	0.000
18987	District 4	51	13	1.104	0.000	0.000	2.404	0.000
19065	District 3	1	1	1.518	0.000	0.000	0.000	0.000

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19140	District 1	8	2	0.000	0.000	0.000	4.718	16.373
19310	District 1	49	23	0.592	0.000	1.360	2.872	0.000
19343	District 2	2	2	1.201	0.000	1.181	0.000	0.000
19343	District 3	194	107	1.135	1.254	0.644	0.922	0.927
19415	District 4	4	4	0.897	0.000	2.242	0.000	0.000
19529	District 1	245	124	0.934	0.000	1.199	1.141	0.792
19529	District 2	1	1	2.401	0.000	0.000	0.000	0.000
19640	District 1	1	1	1.702	0.000	0.000	0.000	0.000
19640	District 7	238	186	1.054	1.768	0.517	0.159	1.285
20018	District 3	2	2	0.759	0.000	0.000	6.165	0.000
20018	Lakes District	5	4	0.681	0.000	0.000	15.292	0.000
20059	District 2	58	32	0.825	0.000	0.959	1.760	1.265
20064	District 7	123	77	1.003	0.474	1.110	1.155	0.887
20106	District 1	10	6	0.851	0.000	1.304	0.000	5.458
20106	Lakes District	4	4	0.681	0.000	2.430	0.000	0.000
20399	District 2	65	50	1.201	3.643	0.803	0.804	0.810
20401	District 2	158	89	0.998	0.000	0.902	1.356	1.364
20401	District 3	2	2	0.000	0.000	4.304	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
20415	District 3	330	189	1.148	0.000	0.706	0.457	2.099
20466	District 2	17	3	0.800	0.000	1.574	0.000	0.000
20466	District 3	29	8	0.949	0.000	1.614	0.000	0.000
20560	District 1	11	4	0.426	0.000	2.933	0.000	0.000
20560	District 4	134	38	1.101	0.000	0.472	0.823	0.000
20692	District 1	41	22	1.393	0.000	0.356	0.858	0.000
20784	District 4	9	5	0.957	0.000	1.793	0.000	0.000
20891	District 7	96	80	1.057	0.457	1.069	0.371	0.427
21213	District 7	54	46	1.066	0.000	0.929	0.644	0.742
21282	District 1	7	2	0.851	0.000	1.956	0.000	0.000
21282	District 2	26	10	0.240	0.000	0.708	4.826	0.000
21282	District 3	17	8	1.138	0.000	1.076	0.000	0.000
21467	District 1	28	15	0.908	3.275	0.782	1.887	0.000
21750	District 6	123	32	1.121	0.000	0.988	0.000	0.000
21881	District 1	2	1	1.702	0.000	0.000	0.000	0.000
21881	District 6	122	48	1.064	0.000	0.769	1.293	0.000
22228	District 1	5	2	1.702	0.000	0.000	0.000	0.000
22228	District 2	8	6	1.201	0.000	0.787	1.341	0.000
22228	District 4	4	3	1.196	0.000	0.000	0.000	0.000

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22228	Lakes District	19	15	0.908	0.000	1.620	0.000	0.000
22266	District 4	6	1	1.196	0.000	0.000	0.000	0.000
22297	District 2	1	1	0.000	0.000	0.000	8.044	0.000
22297	District 3	22	6	1.265	0.000	0.000	2.055	0.000
22304	District 1	32	11	0.464	0.000	1.067	0.858	11.907
22304	District 2	16	3	0.000	0.000	1.574	2.681	0.000
22304	District 3	497	318	0.959	2.110	1.110	1.008	0.624
22304	District 4	15	2	0.598	0.000	0.000	15.629	0.000
22445	District 1	2	2	0.000	0.000	1.956	4.718	0.000
22445	District 6	2	1	1.380	0.000	0.000	0.000	0.000
22492	District 3	12	8	0.949	0.000	1.076	1.541	0.000
22533	District 1	6	4	0.851	0.000	0.978	2.359	0.000
22533	District 4	1	1	1.196	0.000	0.000	0.000	0.000
22533	Lakes District	2	2	1.362	0.000	0.000	0.000	0.000
22623	District 4	4	1	1.196	0.000	0.000	0.000	0.000
22962	District 7	4	3	1.225	0.000	0.000	0.000	0.000
23047	District 6	16	3	0.460	0.000	3.514	0.000	0.000
23049	District 3	19	9	0.843	0.000	1.435	1.370	0.000

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23105	District 2	8	4	1.201	0.000	1.181	0.000	0.000
23338	District 3	76	19	0.719	0.000	1.359	1.947	2.610
23361	District 1	1	1	0.000	0.000	0.000	9.435	0.000
23386	District 2	1	1	2.401	0.000	0.000	0.000	0.000
23386	District 3	123	66	0.828	4.066	1.500	0.747	0.751
23436	District 1	7	2	0.000	0.000	3.911	0.000	0.000
23493	District 1	2	1	1.702	0.000	0.000	0.000	0.000
23641	District 1	44	27	1.009	0.000	1.014	1.048	1.213
23641	District 2	36	26	0.646	0.000	1.362	0.928	1.557
23641	District 3	43	35	1.344	0.000	0.246	0.352	1.417
23641	District 4	24	20	0.957	0.000	0.897	3.126	0.000
23641	Lakes District	19	16	1.021	5.097	0.911	0.000	0.000
23641	District 7	1	1	1.225	0.000	0.000	0.000	0.000
23853	District 2	76	26	1.108	0.000	0.999	0.928	0.000
24056	District 2	35	6	0.400	0.000	1.968	0.000	0.000
24085	District 3	63	31	1.126	0.000	0.972	0.398	0.000
24361	District 1	5	3	1.135	16.373	0.000	0.000	0.000
24361	Lakes District	2	2	0.681	0.000	0.000	15.292	0.000

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24525	District 1	11	9	1.135	0.000	0.435	1.048	3.638
24525	District 2	7	7	1.715	0.000	0.337	1.149	0.000
24525	District 3	2	2	0.759	0.000	2.152	0.000	0.000
24525	District 4	1	1	0.000	182.333	0.000	0.000	0.000
24525	Lakes District	64	61	1.005	0.000	1.036	1.003	1.094
24525	District 7	1	1	0.000	0.000	0.000	29.642	0.000
24674	District 2	89	53	0.770	0.000	1.203	0.759	3.055
24742	District 6	8	1	1.380	0.000	0.000	0.000	0.000
24917	District 3	14	5	0.911	0.000	0.000	4.932	0.000
24931	District 7	23	8	0.766	0.000	4.008	0.000	0.000
24963	District 1	14	3	1.135	0.000	0.000	0.000	10.915
24978	District 3	27	1	1.518	0.000	0.000	0.000	0.000
25046	District 1	5	3	0.567	0.000	2.607	0.000	0.000
25046	District 2	2	2	2.401	0.000	0.000	0.000	0.000
25046	Lakes District	7	6	0.908	0.000	1.620	0.000	0.000
25234	District 7	72	44	0.863	1.661	2.186	1.347	0.000
25248	District 1	3	2	0.851	0.000	0.000	0.000	16.373
25248	District 6	17	9	0.460	0.000	2.343	3.449	0.000

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25471	District 3	9	1	1.518	0.000	0.000	0.000	0.000
25535	District 4	42	9	0.797	0.000	2.989	0.000	0.000
25628	District 1	84	29	0.763	1.694	0.944	1.952	2.258
25628	District 2	2	2	1.201	0.000	0.000	4.022	0.000
25628	District 4	1	1	1.196	0.000	0.000	0.000	0.000
25886	District 3	3	1	0.000	0.000	4.304	0.000	0.000
25886	District 4	177	139	0.886	1.312	1.871	0.899	0.984
26121	District 2	90	73	0.460	2.495	1.197	2.094	0.554
26165	District 3	7	2	1.518	0.000	0.000	0.000	0.000
26527	District 4	35	7	1.025	0.000	1.281	0.000	0.000
26634	District 4	45	15	0.957	0.000	0.598	4.168	0.000
26796	District 4	22	5	0.957	0.000	1.793	0.000	0.000
26796	Lakes District	1	1	1.362	0.000	0.000	0.000	0.000
26796	District 7	100	72	0.987	1.015	1.336	0.823	0.474
26947	District 6	24	11	1.004	0.000	0.479	2.822	0.000
27173	District 1	3	1	0.000	0.000	3.911	0.000	0.000
27173	District 3	4	2	1.518	0.000	0.000	0.000	0.000
27173	District 4	3	1	1.196	0.000	0.000	0.000	0.000
27188	District 1	37	13	0.655	3.778	1.805	0.726	0.000

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27198	District 2	9	4	1.801	0.000	0.590	0.000	0.000
27199	District 3	30	3	1.012	0.000	0.000	4.110	0.000
27236	District 1	50	46	1.073	2.136	0.935	0.820	0.000
27236	District 6	460	366	0.894	3.456	1.325	1.060	0.576
27327	District 2	94	56	0.600	1.626	1.349	1.149	0.723
27394	District 1	2	2	1.702	0.000	0.000	0.000	0.000
27537	District 1	39	14	1.094	10.525	0.279	0.674	0.000
27537	District 6	41	20	0.897	0.000	1.845	0.000	0.000
27671	District 3	20	8	0.949	0.000	1.614	0.000	0.000
27690	District 1	11	7	1.216	0.000	0.000	2.696	0.000
27704	District 3	26	2	0.759	0.000	2.152	0.000	0.000
27866	District 1	6	3	0.567	0.000	2.607	0.000	0.000
27876	District 2	143	62	0.852	2.938	1.066	0.908	1.959
27996	District 4	84	23	0.988	0.000	0.780	2.718	0.000
28010	District 3	6	1	1.518	0.000	0.000	0.000	0.000
28176	District 1	6	6	1.419	0.000	0.000	1.573	0.000
28176	District 2	1	1	0.000	0.000	2.361	0.000	0.000
28214	District 3	2	1	0.000	0.000	4.304	0.000	0.000
28219	District 1	2	1	0.000	0.000	3.911	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
28219	District 6	31	18	0.843	0.000	0.878	2.587	3.904
28286	District 1	109	40	0.894	0.000	1.467	0.944	0.000
28286	Lakes District	11	4	0.681	0.000	1.215	0.000	16.682
28354	District 4	1	1	1.196	0.000	0.000	0.000	0.000
28404	District 2	41	8	1.201	0.000	0.885	0.000	5.060
28572	District 4	69	13	0.920	0.000	2.069	0.000	0.000
28649	District 1	5	1	1.702	0.000	0.000	0.000	0.000
28649	Lakes District	12	2	1.362	0.000	0.000	0.000	0.000
28656	District 2	10	4	0.000	0.000	1.771	2.011	0.000
28656	District 3	26	8	0.949	0.000	1.076	1.541	0.000
28656	District 4	15	5	1.196	0.000	0.000	0.000	0.000
28658	District 1	23	4	1.277	0.000	0.978	0.000	0.000
28658	District 2	19	5	0.000	0.000	1.889	1.609	0.000
28658	District 3	21	12	1.012	0.000	0.717	2.055	0.000
28658	District 4	110	32	1.009	0.000	1.121	0.977	0.000
28658	Lakes District	14	5	1.089	0.000	0.972	0.000	0.000
28738	District 1	16	14	0.973	0.000	0.838	1.348	2.339

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
28738	District 2	1	1	0.000	0.000	2.361	0.000	0.000
28738	District 3	1	1	1.518	0.000	0.000	0.000	0.000
28738	District 4	8	7	0.683	0.000	0.000	4.465	19.536
28738	Lakes District	16	14	0.973	5.825	1.042	0.000	0.000
28761	District 2	18	2	0.000	0.000	1.181	0.000	20.238
28820	District 1	10	4	1.277	0.000	0.978	0.000	0.000
28820	District 6	121	25	0.828	0.000	1.687	1.242	0.000
28854	District 2	15	7	1.372	0.000	0.675	1.149	0.000
28868	District 6	33	13	1.168	0.000	0.000	1.194	5.406
28919	District 2	17	3	0.000	0.000	2.361	0.000	0.000
29112	District 1	1	1	0.000	0.000	3.911	0.000	0.000
29112	District 2	12	4	0.600	0.000	1.181	2.011	0.000
29112	Lakes District	1	1	1.362	0.000	0.000	0.000	0.000
29165	District 1	2	2	1.702	0.000	0.000	0.000	0.000
29165	District 6	333	312	1.177	0.000	0.524	0.547	0.901
29319	District 4	13	1	1.196	0.000	0.000	0.000	0.000
29325	District 1	1	1	1.702	0.000	0.000	0.000	0.000
29325	District 2	1	1	2.401	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
29325	District 3	3	3	0.506	0.000	1.435	4.110	0.000
29325	District 4	39	20	1.016	0.000	0.000	3.126	3.419
29407	District 2	19	10	0.960	0.000	0.472	1.609	8.095
29407	District 3	37	27	1.349	0.000	0.159	0.457	1.837
29783	District 1	72	24	1.277	0.000	0.815	0.393	0.000
29834	District 1	1	1	0.000	0.000	0.000	9.435	0.000
29834	District 2	14	9	1.067	0.000	1.049	0.894	0.000
29834	District 3	15	12	0.885	0.000	0.717	2.055	4.132
29834	Lakes District	6	3	0.908	0.000	1.620	0.000	0.000
29849	District 1	2	1	1.702	0.000	0.000	0.000	0.000
30015	District 2	1	1	0.000	0.000	2.361	0.000	0.000
30050	District 1	4	2	0.851	0.000	1.956	0.000	0.000
30050	District 2	73	60	0.920	0.000	1.259	0.402	1.349
30050	District 3	48	41	0.925	0.000	1.365	0.902	0.000
30050	District 4	2	2	1.196	0.000	0.000	0.000	0.000
30050	Lakes District	5	4	1.021	0.000	0.000	0.000	16.682
30053	District 2	18	12	1.401	0.000	0.197	1.341	6.746
30147	District 1	18	6	0.567	0.000	1.304	3.145	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Citations by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
30147	Lakes District	2	2	0.681	0.000	2.430	0.000	0.000
32001	District 3	5	1	1.518	0.000	0.000	0.000	0.000
32012	District 2	1	1	0.000	0.000	2.361	0.000	0.000
32017	District 4	1	1	1.196	0.000	0.000	0.000	0.000
32056	District 1	1	1	1.702	0.000	0.000	0.000	0.000
32078	District 4	1	1	1.196	0.000	0.000	0.000	0.000
32084	District 4	116	41	1.108	0.000	0.437	0.762	0.000
32107	District 3	26	7	1.301	0.000	0.615	0.000	0.000
32112	District 1	244	90	1.002	3.820	0.739	0.734	2.183
32112	District 2	10	5	0.960	0.000	0.944	1.609	0.000
32112	District 3	4	2	0.000	0.000	4.304	0.000	0.000
32112	Lakes District	3	2	1.362	0.000	0.000	0.000	0.000
32112	District 6	1	1	1.380	0.000	0.000	0.000	0.000
32117	District 2	103	23	0.209	0.000	1.540	2.098	0.000
32136	District 1	2	1	1.702	0.000	0.000	0.000	0.000
32149	District 2	6	3	1.601	0.000	0.787	0.000	0.000

Appendix C. Type of Stop – Incidental Contact, Deputy-District Comparison Ratio

Deputy ID	District	Deputy's Total Stops by District	Deputy's Incidental Contacts by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
692	District 6	103	1	0.000	0.000	3.000	0.000	0.000
1561	District 2	45	1	0.000	0.000	2.000	0.000	0.000
2953	District 3	73	1	1.385	0.000	0.000	0.000	0.000
3248	District 1	20	1	0.000	0.000	0.000	0.000	11.000
3746	District 3	31	1	1.385	0.000	0.000	0.000	0.000
3832	District 2	82	1	4.000	0.000	0.000	0.000	0.000
4542	District 6	138	2	1.500	0.000	0.000	0.000	0.000
4700	District 3	201	1	1.385	0.000	0.000	0.000	0.000
4926	District 1	1	1	1.737	0.000	0.000	0.000	0.000
6170	District 1	115	1	1.737	0.000	0.000	0.000	0.000
6244	District 4	5	1	1.375	0.000	0.000	0.000	0.000
7060	District 4	215	1	1.375	0.000	0.000	0.000	0.000
7060	Lakes District	71	1	0.000	0.000	2.000	0.000	0.000
7274	District 1	27	1	1.737	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Incidental Contacts by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
7696	District 6	68	1	0.000	0.000	3.000	0.000	0.000
7883	District 3	26	1	1.385	0.000	0.000	0.000	0.000
7984	District 3	7	1	1.385	0.000	0.000	0.000	0.000
8161	District 3	9	1	1.385	0.000	0.000	0.000	0.000
8265	District 1	17	1	1.737	0.000	0.000	0.000	0.000
8598	District 2	27	2	0.000	0.000	1.000	2.667	0.000
8960	District 1	68	1	1.737	0.000	0.000	0.000	0.000
8997	District 3	28	1	1.385	0.000	0.000	0.000	0.000
9316	District 1	108	2	0.868	0.000	0.000	0.000	5.500
10809	District 3	55	1	1.385	0.000	0.000	0.000	0.000
10996	District 3	31	1	1.385	0.000	0.000	0.000	0.000
11234	District 1	42	1	1.737	0.000	0.000	0.000	0.000
11625	District 3	153	1	1.385	0.000	0.000	0.000	0.000
11753	District 3	87	1	1.385	0.000	0.000	0.000	0.000
11849	District 2	183	1	0.000	0.000	0.000	0.000	16.000
12138	District 3	75	1	1.385	0.000	0.000	0.000	0.000
12495	District 3	11	1	1.385	0.000	0.000	0.000	0.000
12495	District 4	54	2	0.688	0.000	0.000	1.833	0.000
13135	District 2	3	1	0.000	0.000	2.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Incidental Contacts by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
13722	District 1	32	1	0.000	0.000	3.667	0.000	0.000
13722	District 2	175	2	0.000	0.000	2.000	0.000	0.000
13946	District 3	18	1	1.385	0.000	0.000	0.000	0.000
14241	District 2	178	2	2.000	0.000	1.000	0.000	0.000
14711	District 1	72	2	0.868	0.000	1.833	0.000	0.000
14730	District 6	897	2	1.500	0.000	0.000	0.000	0.000
14941	District 2	112	1	0.000	0.000	2.000	0.000	0.000
15139	Lakes District	1	1	2.000	0.000	0.000	0.000	0.000
15761	District 1	69	2	1.737	0.000	0.000	0.000	0.000
16293	District 2	23	1	4.000	0.000	0.000	0.000	0.000
16474	District 3	99	2	0.000	0.000	2.000	18.000	0.000
17217	District 3	452	3	0.000	0.000	4.000	0.000	0.000
17295	District 1	15	1	1.737	0.000	0.000	0.000	0.000
17433	District 1	71	2	0.000	0.000	1.833	16.500	0.000
17456	District 4	16	1	1.375	0.000	0.000	0.000	0.000
17456	District 7	158	1	1.000	0.000	0.000	0.000	0.000
17800	District 4	17	1	1.375	0.000	0.000	0.000	0.000
17842	District 1	22	1	1.737	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Incidental Contacts by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
19310	District 1	49	1	0.000	0.000	0.000	0.000	11.000
19529	District 1	245	1	0.000	0.000	3.667	0.000	0.000
20415	District 3	330	2	0.692	0.000	2.000	0.000	0.000
20560	District 4	134	3	0.917	0.000	0.000	1.222	0.000
21282	District 2	26	1	0.000	0.000	2.000	0.000	0.000
22304	District 3	497	9	0.923	0.000	1.333	0.000	0.000
23386	District 3	123	2	1.385	0.000	0.000	0.000	0.000
23641	District 1	44	1	0.000	0.000	3.667	0.000	0.000
24085	District 3	63	1	1.385	0.000	0.000	0.000	0.000
25628	District 1	84	2	0.868	0.000	1.833	0.000	0.000
26121	District 2	90	1	0.000	0.000	0.000	5.333	0.000
27173	District 3	4	1	1.385	0.000	0.000	0.000	0.000
27704	District 3	26	1	0.000	0.000	4.000	0.000	0.000
28286	District 1	109	4	0.434	0.000	2.750	0.000	0.000
28658	District 4	110	1	1.375	0.000	0.000	0.000	0.000
29325	District 4	39	1	0.000	0.000	0.000	3.667	0.000
29783	District 1	72	1	0.000	33.000	0.000	0.000	0.000
29849	District 1	2	1	1.737	0.000	0.000	0.000	0.000
30147	District 1	18	1	1.737	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Incidental Contacts by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
32107	District 3	26	1	1.385	0.000	0.000	0.000	0.000
32112	District 1	244	3	1.737	0.000	0.000	0.000	0.000
32112	District 2	10	1	0.000	0.000	0.000	5.333	0.000
32149	District 2	6	1	4.000	0.000	0.000	0.000	0.000

Appendix D. Type of Stop – Warning, Deputy-District Comparison Ratio

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
28	District 3	11	6	1.176	0.000	0.824	0.000	0.000
36	District 1	25	12	0.380	0.000	2.977	1.669	0.000
36	District 2	1	1	2.360	0.000	0.000	0.000	0.000
371	District 1	24	8	0.950	6.379	1.276	0.000	0.000
371	District 3	8	5	1.129	0.000	0.989	0.000	0.000
371	District 4	13	4	0.877	0.000	0.000	6.452	0.000
371	Lakes District	22	8	1.086	0.000	0.000	3.297	0.000
483	District 1	1	1	0.000	0.000	0.000	10.013	0.000
483	District 7	77	51	0.971	0.000	1.607	0.529	2.342
516	District 4	17	7	0.836	0.000	3.239	0.000	0.000
537	District 1	9	3	1.013	0.000	1.701	0.000	0.000
692	District 1	13	9	1.013	0.000	1.701	0.000	0.000
692	District 6	103	39	1.030	0.000	0.957	0.725	1.436
941	District 4	4	4	1.170	0.000	0.000	0.000	0.000
941	District 7	113	107	1.022	0.558	1.379	0.252	0.558

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
996	District 2	39	14	0.506	0.000	1.571	0.571	2.116
1561	District 2	45	27	1.399	0.000	0.634	1.184	0.000
1980	District 1	1	1	1.520	0.000	0.000	0.000	0.000
2041	District 7	42	17	1.016	3.513	0.000	1.586	0.000
2306	District 3	60	53	0.958	0.000	1.213	0.904	0.857
2539	District 3	160	93	0.986	0.000	1.223	0.343	1.466
2553	District 2	74	37	0.829	0.000	1.453	0.432	0.000
2571	District 1	3	3	0.507	0.000	1.701	3.338	0.000
2618	District 1	30	23	1.057	0.000	0.666	1.306	1.638
2618	District 6	1	1	0.000	0.000	0.000	14.131	0.000
2949	District 1	4	1	1.520	0.000	0.000	0.000	0.000
2949	District 3	40	20	1.058	0.000	0.989	0.798	0.000
2953	District 3	73	55	1.077	0.000	0.899	0.871	0.000
2953	District 4	1	1	0.000	0.000	11.336	0.000	0.000
2969	District 1	5	2	1.520	0.000	0.000	0.000	0.000
2977	District 2	67	41	1.036	0.000	0.894	0.780	2.891
3069	District 7	79	24	1.008	2.488	1.366	0.000	0.000
3074	District 1	83	14	1.085	0.000	0.365	2.146	0.000
3074	District 3	2	1	1.411	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
3074	District 4	2	1	1.170	0.000	0.000	0.000	0.000
3074	Lakes District	75	35	1.099	0.000	0.223	0.754	3.014
3076	District 1	51	24	0.823	0.000	1.701	0.834	1.569
3076	District 4	7	1	1.170	0.000	0.000	0.000	0.000
3076	Lakes District	111	11	1.241	0.000	0.000	0.000	0.000
3248	District 1	20	13	1.052	0.000	1.178	0.000	2.897
3326	District 7	44	18	1.088	0.000	0.911	0.000	0.000
3439	District 2	88	5	1.416	0.000	0.978	0.000	0.000
3466	District 2	25	14	0.674	0.000	1.222	1.142	2.116
3466	District 6	4	2	1.339	0.000	0.000	0.000	0.000
3487	District 2	20	10	1.652	0.000	0.000	2.398	0.000
3506	District 2	31	29	0.895	0.000	1.264	0.276	2.044
3587	District 1	1	1	1.520	0.000	0.000	0.000	0.000
3587	District 6	33	30	0.759	0.000	2.074	1.413	0.000
3604	District 1	40	33	0.829	3.093	0.773	2.124	1.141
3704	District 4	39	28	1.044	0.000	0.810	0.000	2.063
3727	District 1	2	2	1.520	0.000	0.000	0.000	0.000
3746	District 3	31	13	1.194	0.000	0.761	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
3832	District 1	11	8	1.140	0.000	0.638	1.252	0.000
3832	District 2	82	45	0.734	0.000	1.466	0.710	0.000
3832	District 3	5	1	0.000	0.000	4.944	0.000	0.000
3911	District 1	50	1	0.000	0.000	0.000	10.013	0.000
3937	District 3	13	2	1.411	0.000	0.000	0.000	0.000
3983	District 1	9	4	1.520	0.000	0.000	0.000	0.000
3983	District 4	2	1	1.170	0.000	0.000	0.000	0.000
4277	District 2	21	4	1.770	0.000	0.000	1.998	0.000
4299	District 2	482	175	0.931	2.064	0.908	1.370	1.355
4299	District 3	2	1	0.000	0.000	0.000	15.966	0.000
4401	Lakes District	1	1	1.241	0.000	0.000	0.000	0.000
4497	District 7	296	139	1.011	0.000	0.708	1.552	1.289
4542	District 1	24	4	0.760	0.000	1.276	0.000	9.417
4542	District 6	138	26	0.927	0.000	0.957	1.630	2.154
4700	District 1	8	6	1.266	0.000	0.000	1.669	0.000
4700	District 2	34	19	0.994	0.000	1.286	0.421	0.000
4700	District 3	201	131	0.948	0.000	1.132	1.219	1.041
4700	District 4	3	2	0.000	0.000	11.336	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
4700	Lakes District	27	13	1.146	0.000	0.601	0.000	0.000
4780	District 3	1	1	1.411	0.000	0.000	0.000	0.000
4926	District 6	10	8	1.339	0.000	0.000	0.000	0.000
5266	District 3	33	27	1.254	0.000	0.183	1.183	0.000
5293	District 6	9	1	1.339	0.000	0.000	0.000	0.000
5502	District 3	21	14	0.907	0.000	1.059	2.281	0.000
5529	District 1	11	5	0.608	10.206	2.041	0.000	0.000
5669	District 1	14	14	0.651	3.645	2.187	0.715	0.000
5714	District 2	77	37	1.084	0.000	1.189	0.432	0.000
5721	District 2	3	3	0.787	0.000	1.629	0.000	0.000
5947	District 1	20	11	0.967	0.000	1.392	0.910	0.000
5947	District 2	4	2	2.360	0.000	0.000	0.000	0.000
6062	District 1	6	1	1.520	0.000	0.000	0.000	0.000
6062	District 6	50	12	1.004	0.000	1.037	0.000	4.667
6170	District 1	115	68	0.782	0.000	1.801	1.031	1.108
6170	District 2	1	1	0.000	0.000	2.444	0.000	0.000
6223	District 2	1	1	0.000	0.000	0.000	7.992	0.000
6223	District 3	4	4	1.058	0.000	1.236	0.000	0.000
6223	District 4	8	6	1.170	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
6233	District 1	12	3	0.507	0.000	1.701	3.338	0.000
6233	District 6	44	28	1.052	0.000	0.889	1.009	0.000
6244	District 2	78	10	0.944	0.000	0.978	1.598	0.000
6244	District 3	38	5	1.411	0.000	0.000	0.000	0.000
6244	District 4	5	1	1.170	0.000	0.000	0.000	0.000
6244	Lakes District	11	3	0.000	0.000	5.210	8.792	0.000
6308	District 1	6	4	1.140	12.758	0.000	0.000	0.000
6308	Lakes District	3	1	0.000	0.000	0.000	0.000	52.750
6308	District 6	3	2	0.670	0.000	3.111	0.000	0.000
6325	District 1	10	6	1.520	0.000	0.000	0.000	0.000
6325	District 6	12	4	1.004	0.000	1.556	0.000	0.000
6619	District 3	12	8	1.411	0.000	0.000	0.000	0.000
6951	District 1	13	4	0.760	0.000	0.000	5.006	0.000
6951	District 4	17	4	1.170	0.000	0.000	0.000	0.000
7060	District 1	1	1	1.520	0.000	0.000	0.000	0.000
7060	District 2	5	4	1.770	0.000	0.000	1.998	0.000
7060	District 3	4	2	0.705	0.000	0.000	7.983	0.000
7060	District 4	215	94	0.971	0.000	1.447	1.098	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
7060	Lakes District	71	29	1.027	0.000	0.808	1.819	0.000
7070	District 2	56	41	0.461	0.000	1.490	1.364	0.723
7096	District 3	1	1	1.411	0.000	0.000	0.000	0.000
7274	District 1	27	17	1.252	0.000	0.000	1.767	0.000
7274	District 6	281	175	0.980	0.000	0.853	1.615	0.960
7309	District 1	1	1	0.000	0.000	5.103	0.000	0.000
7309	District 2	136	68	1.111	1.770	0.755	1.293	1.307
7309	District 3	178	57	1.188	0.000	0.520	0.840	0.000
7309	District 4	9	4	0.585	0.000	2.834	0.000	14.440
7309	Lakes District	45	14	0.975	7.536	0.558	1.884	0.000
7323	District 1	9	1	1.520	0.000	0.000	0.000	0.000
7337	District 3	1	1	1.411	0.000	0.000	0.000	0.000
7337	District 4	73	39	1.020	0.000	0.000	1.985	2.962
7559	District 2	4	3	1.574	40.125	0.000	0.000	0.000
7682	District 2	69	32	0.443	0.000	1.451	1.748	0.000
7696	District 1	4	2	0.760	0.000	0.000	0.000	18.833
7696	District 6	68	17	1.339	0.000	0.000	0.000	0.000
7750	District 3	15	12	0.705	0.000	2.060	1.331	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
7754	District 1	1	1	1.520	0.000	0.000	0.000	0.000
7754	District 2	1	1	0.000	0.000	2.444	0.000	0.000
7872	District 2	181	51	1.296	0.000	0.911	0.157	1.743
7872	District 3	31	9	1.254	0.000	0.549	0.000	0.000
7872	District 4	3	2	0.585	0.000	0.000	12.904	0.000
7883	District 3	26	22	1.026	0.000	1.124	0.000	2.066
7918	District 2	129	79	0.926	1.524	1.083	0.809	1.500
7980	District 3	22	17	0.913	13.900	0.872	0.939	2.673
7984	District 3	7	1	0.000	0.000	4.944	0.000	0.000
7984	District 4	6	1	1.170	0.000	0.000	0.000	0.000
7994	District 6	6	4	1.004	0.000	0.000	3.533	0.000
8091	District 4	7	5	0.702	0.000	2.267	0.000	11.552
8091	District 7	156	20	0.864	2.986	1.639	1.348	2.986
8161	District 1	6	2	0.760	0.000	0.000	5.006	0.000
8161	District 2	4	1	0.000	0.000	2.444	0.000	0.000
8161	District 3	9	3	0.470	0.000	3.296	0.000	0.000
8161	District 4	8	2	0.585	0.000	5.668	0.000	0.000
8189	District 1	17	8	1.330	0.000	0.000	1.252	0.000
8257	Lakes District	3	2	0.621	0.000	3.907	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
8265	District 1	17	5	0.912	0.000	2.041	0.000	0.000
8265	District 2	31	10	0.944	0.000	1.222	0.799	0.000
8598	District 2	27	8	1.180	0.000	0.917	0.999	0.000
8729	District 1	4	3	0.000	0.000	1.701	6.675	0.000
8729	District 2	5	3	0.787	0.000	0.815	2.664	0.000
8729	District 3	32	10	0.988	0.000	0.989	0.000	4.544
8729	District 4	5	1	1.170	0.000	0.000	0.000	0.000
8729	Lakes District	31	3	1.241	0.000	0.000	0.000	0.000
8750	District 3	22	11	0.513	42.964	1.348	1.451	4.131
8757	District 1	3	2	0.760	0.000	0.000	5.006	0.000
8874	District 1	8	2	1.520	0.000	0.000	0.000	0.000
8874	District 6	128	47	1.026	0.000	0.662	1.804	0.000
8898	District 1	14	11	1.382	0.000	0.000	0.910	0.000
8921	District 2	13	11	1.931	0.000	0.222	0.000	2.694
8936	District 2	17	9	1.049	0.000	1.358	0.000	0.000
8960	District 1	68	54	1.098	0.945	0.945	0.556	0.698
8960	District 6	17	16	1.172	0.000	0.778	0.000	0.000
8997	District 2	31	22	0.751	0.000	0.444	3.996	0.000
8997	District 3	28	8	0.529	29.538	1.854	1.996	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
8997	District 4	1	1	1.170	0.000	0.000	0.000	0.000
9058	District 1	83	43	0.778	4.747	1.424	1.164	0.000
9132	District 1	12	5	1.216	0.000	1.021	0.000	0.000
9132	District 6	104	70	1.033	0.000	0.533	1.615	1.600
9316	District 1	108	59	0.953	0.865	1.211	0.849	1.277
9329	District 7	51	23	0.901	7.789	0.713	1.173	0.000
9360	District 2	79	44	0.376	5.472	1.389	1.453	1.347
9360	District 3	1	1	1.411	0.000	0.000	0.000	0.000
9453	District 3	65	54	0.940	0.000	0.732	2.661	0.842
9585	District 2	2	2	0.000	0.000	2.444	0.000	0.000
10080	District 2	26	19	1.615	0.000	0.386	0.841	1.560
10080	District 3	1	1	1.411	0.000	0.000	0.000	0.000
10088	District 4	1	1	1.170	0.000	0.000	0.000	0.000
10280	District 7	100	11	0.942	5.429	1.490	0.000	0.000
10303	District 1	2	1	0.000	0.000	5.103	0.000	0.000
10303	District 3	21	6	1.411	0.000	0.000	0.000	0.000
10303	District 4	9	4	0.585	0.000	2.834	6.452	0.000
10303	Lakes District	7	1	0.000	0.000	0.000	26.375	0.000
10318	District 2	16	8	0.000	0.000	1.833	1.998	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
10719	District 4	60	43	1.034	0.000	0.527	0.600	2.687
10809	District 3	55	30	0.940	0.000	1.483	0.532	0.000
10821	District 1	71	27	1.126	1.890	0.378	1.483	0.000
10996	District 2	1	1	2.360	0.000	0.000	0.000	0.000
10996	District 3	31	23	1.165	0.000	0.645	0.000	1.976
11010	District 1	58	26	1.052	0.000	0.981	1.155	0.000
11019	District 2	5	2	1.180	0.000	1.222	0.000	0.000
11019	District 3	1	1	1.411	0.000	0.000	0.000	0.000
11088	District 1	4	4	0.760	0.000	1.276	2.503	0.000
11088	District 6	21	12	0.893	0.000	1.556	1.178	0.000
11205	District 3	113	47	1.141	0.000	0.841	0.340	0.000
11234	District 1	42	3	0.507	17.011	1.701	0.000	0.000
11234	Lakes District	108	5	0.496	0.000	4.689	0.000	0.000
11511	District 1	18	5	0.608	0.000	2.041	2.003	0.000
11511	District 3	2	2	0.000	0.000	2.472	7.983	0.000
11511	District 4	5	2	0.585	0.000	0.000	12.904	0.000
11625	District 3	153	103	1.082	0.000	0.864	0.775	0.441
11692	District 4	137	67	0.943	18.104	1.692	0.385	0.862
11714	District 1	1	1	1.520	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
11714	District 2	10	2	1.180	0.000	1.222	0.000	0.000
11714	District 3	18	2	1.411	0.000	0.000	0.000	0.000
11714	District 4	22	5	0.936	0.000	0.000	5.162	0.000
11714	Lakes District	11	3	0.827	0.000	2.605	0.000	0.000
11753	District 3	87	43	0.919	0.000	1.380	0.000	3.170
11826	District 4	4	3	1.170	0.000	0.000	0.000	0.000
11849	District 2	183	20	1.652	0.000	0.611	0.400	0.000
11869	District 1	5	3	1.520	0.000	0.000	0.000	0.000
11869	District 6	84	42	1.052	0.000	0.593	1.009	2.667
12042	District 1	9	8	1.520	0.000	0.000	0.000	0.000
12044	District 3	84	51	0.968	0.000	1.260	0.626	0.891
12044	District 4	1	1	1.170	0.000	0.000	0.000	0.000
12069	District 2	9	7	0.337	0.000	0.698	2.283	8.466
12138	District 3	75	52	1.031	0.000	0.951	1.228	0.000
12153	District 1	10	2	0.760	0.000	0.000	5.006	0.000
12153	District 6	63	18	0.893	0.000	1.728	0.785	0.000
12327	District 4	4	4	1.170	0.000	0.000	0.000	0.000
12375	District 2	35	10	0.944	0.000	0.489	3.197	0.000
12418	District 2	17	10	1.652	0.000	0.244	1.598	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
12495	District 1	7	3	1.013	0.000	1.701	0.000	0.000
12495	District 3	11	3	0.940	0.000	1.648	0.000	0.000
12495	District 4	54	12	0.975	0.000	0.945	2.151	0.000
12495	Lakes District	13	1	1.241	0.000	0.000	0.000	0.000
12514	District 2	54	32	0.959	0.000	1.069	0.749	1.852
12609	District 4	2	2	1.170	0.000	0.000	0.000	0.000
12735	District 1	10	7	1.303	0.000	0.000	0.000	5.381
12735	District 2	3	3	1.574	0.000	0.000	0.000	9.877
12735	District 3	2	1	1.411	0.000	0.000	0.000	0.000
12735	District 4	8	7	1.003	0.000	0.000	0.000	8.252
12735	District 7	71	38	1.000	0.000	1.294	1.419	0.000
13113	District 7	115	16	1.008	0.000	2.049	0.000	0.000
13135	District 1	5	1	1.520	0.000	0.000	0.000	0.000
13135	District 2	3	1	0.000	0.000	2.444	0.000	0.000
13159	District 1	62	10	1.216	0.000	0.000	1.001	3.767
13159	District 2	11	1	2.360	0.000	0.000	0.000	0.000
13159	District 4	107	3	1.170	0.000	0.000	0.000	0.000
13159	Lakes District	125	9	0.965	0.000	1.737	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
13159	District 7	65	5	1.152	0.000	0.000	0.000	0.000
13160	District 1	1	1	1.520	0.000	0.000	0.000	0.000
13160	District 2	8	5	0.944	0.000	1.466	0.000	0.000
13160	District 3	9	6	0.940	0.000	0.824	2.661	0.000
13331	District 1	25	9	0.844	0.000	1.701	1.113	0.000
13331	District 2	12	8	1.180	0.000	1.222	0.000	0.000
13331	District 3	254	165	0.872	0.000	1.318	1.258	1.652
13331	District 4	5	2	0.585	0.000	0.000	0.000	28.881
13558	District 2	18	13	1.271	0.000	0.752	1.229	0.000
13579	District 3	38	35	0.967	6.751	1.412	0.000	0.000
13636	District 2	5	5	0.944	0.000	0.978	0.000	5.926
13722	District 1	32	16	1.330	0.000	0.319	0.626	0.000
13722	District 2	175	40	1.003	0.000	0.917	1.598	0.000
13722	District 4	13	2	0.585	0.000	5.668	0.000	0.000
13946	District 3	18	9	0.940	0.000	1.648	0.000	0.000
14241	District 2	178	14	1.686	0.000	0.698	0.000	0.000
14271	District 4	34	24	1.072	0.000	0.472	1.075	0.000
14505	District 7	98	42	1.042	0.000	0.390	0.000	4.265
14604	District 3	15	11	0.898	0.000	1.348	0.000	4.131

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
14711	District 1	72	41	0.741	0.000	1.743	1.465	0.919
14730	District 1	203	42	1.085	0.000	0.972	0.477	1.794
14730	District 6	897	156	0.962	3.231	1.197	0.996	0.359
14772	District 1	8	7	1.520	0.000	0.000	0.000	0.000
14772	District 2	3	2	2.360	0.000	0.000	0.000	0.000
14772	District 3	6	5	0.846	0.000	0.989	3.193	0.000
14772	District 4	3	3	0.780	0.000	3.779	0.000	0.000
14941	District 2	112	49	0.626	2.457	1.047	1.468	3.024
15124	District 6	2	2	0.670	0.000	0.000	0.000	28.000
15139	District 2	1	1	2.360	0.000	0.000	0.000	0.000
15139	District 4	6	5	0.702	0.000	2.267	5.162	0.000
15221	District 2	31	24	1.672	0.000	0.509	0.333	1.235
15326	District 6	230	42	1.212	0.000	0.593	0.000	0.000
15755	District 3	8	6	1.176	0.000	0.000	0.000	7.574
15755	District 4	15	6	0.585	0.000	5.668	0.000	0.000
15760	District 1	34	13	0.935	0.000	0.393	2.311	2.897
15760	District 6	115	58	0.831	0.000	1.287	1.705	2.897
15761	District 1	69	37	1.191	2.759	0.690	0.271	0.000
15820	District 4	18	14	1.003	0.000	0.810	1.843	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
16078	District 4	1	1	1.170	0.000	0.000	0.000	0.000
16293	District 2	23	2	1.180	0.000	1.222	0.000	0.000
16369	District 4	4	2	1.170	0.000	0.000	0.000	0.000
16369	District 7	188	96	1.044	0.622	0.854	0.843	0.000
16431	District 1	20	16	1.140	0.000	0.957	0.626	0.000
16431	District 6	46	33	0.893	0.000	1.697	0.856	0.000
16474	District 3	99	46	1.073	0.000	0.752	0.694	1.976
16553	District 2	3	2	1.180	0.000	0.000	3.996	0.000
16553	District 3	3	2	1.411	0.000	0.000	0.000	0.000
16563	District 2	31	21	0.674	0.000	1.513	0.761	0.000
16667	District 1	9	3	1.013	0.000	1.701	0.000	0.000
16672	District 1	2	2	1.520	0.000	0.000	0.000	0.000
16672	Lakes District	5	5	1.241	0.000	0.000	0.000	0.000
16687	District 2	2	2	1.180	0.000	1.222	0.000	0.000
16687	District 3	48	32	0.926	0.000	1.236	0.998	1.420
16690	District 1	5	5	0.912	0.000	1.021	0.000	7.533
16690	District 4	172	105	1.014	0.000	1.188	0.492	0.550
16905	District 2	46	40	1.416	0.000	0.794	0.200	1.482
16996	District 2	82	33	1.001	3.648	0.963	1.211	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
16996	Lakes District	1	1	0.000	0.000	7.815	0.000	0.000
17071	District 3	47	27	1.149	0.000	0.915	0.000	0.000
17217	District 3	452	160	0.961	1.477	0.896	1.597	1.420
17295	District 1	15	1	0.000	0.000	0.000	10.013	0.000
17295	Lakes District	12	3	1.241	0.000	0.000	0.000	0.000
17433	District 1	71	21	0.651	0.000	2.187	1.430	0.000
17456	District 1	9	4	0.760	0.000	1.276	2.503	0.000
17456	District 4	16	5	0.936	0.000	2.267	0.000	0.000
17456	District 7	158	26	1.063	0.000	0.630	0.000	2.297
17464	District 1	23	12	1.013	4.253	0.425	1.669	0.000
17464	District 6	42	33	0.933	0.000	1.131	0.856	3.394
17534	District 4	8	2	1.170	0.000	0.000	0.000	0.000
17534	Lakes District	2	2	1.241	0.000	0.000	0.000	0.000
17800	District 1	9	3	1.520	0.000	0.000	0.000	0.000
17800	District 2	35	8	0.885	0.000	0.611	1.998	3.704
17800	District 3	31	2	0.705	0.000	2.472	0.000	0.000
17800	District 4	17	2	1.170	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
17800	Lakes District	16	6	0.827	0.000	1.302	0.000	8.792
17809	District 2	14	8	0.590	0.000	1.222	0.999	3.704
17842	District 1	22	6	1.266	0.000	0.851	0.000	0.000
17842	Lakes District	11	3	0.827	0.000	2.605	0.000	0.000
17997	District 1	17	15	1.013	0.000	1.021	1.335	0.000
17997	District 4	1	1	1.170	0.000	0.000	0.000	0.000
17997	District 6	121	108	1.042	0.000	0.979	0.916	0.000
18131	District 3	32	8	1.411	0.000	0.000	0.000	0.000
18131	Lakes District	9	1	1.241	0.000	0.000	0.000	0.000
18247	District 1	13	12	1.013	4.253	0.425	0.000	6.278
18340	District 1	4	2	1.520	0.000	0.000	0.000	0.000
18340	District 2	3	2	0.000	0.000	2.444	0.000	0.000
18340	District 4	4	2	1.170	0.000	0.000	0.000	0.000
18340	Lakes District	5	1	0.000	105.500	0.000	0.000	0.000
18521	District 4	59	13	1.170	0.000	0.000	0.000	0.000
18530	District 2	19	18	0.656	0.000	1.086	2.220	0.000
18561	District 7	39	9	0.896	0.000	0.000	5.993	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
18667	District 4	11	9	1.040	0.000	1.260	0.000	0.000
18930	District 6	38	36	0.893	0.000	1.728	0.785	0.000
18987	District 4	51	37	1.012	0.000	0.306	1.395	3.122
19140	District 1	8	6	1.013	0.000	1.701	0.000	0.000
19199	District 1	5	5	1.216	0.000	0.000	2.003	0.000
19199	District 3	1	1	1.411	0.000	0.000	0.000	0.000
19310	District 1	49	24	0.950	2.126	0.851	0.834	3.139
19343	District 3	194	87	1.184	0.000	0.511	0.734	0.522
19343	Lakes District	1	1	1.241	0.000	0.000	0.000	0.000
19529	District 1	245	120	1.114	0.000	0.893	0.668	0.942
19529	District 6	1	1	0.000	0.000	6.222	0.000	0.000
19640	District 7	238	52	1.041	3.445	0.000	0.519	1.148
19659	District 3	17	17	1.079	0.000	0.872	0.939	0.000
20018	Lakes District	5	1	1.241	0.000	0.000	0.000	0.000
20059	District 2	58	26	1.271	4.630	0.846	0.000	2.279
20064	District 4	1	1	1.170	0.000	0.000	0.000	0.000
20064	Lakes District	1	1	1.241	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
20064	District 7	123	46	0.976	1.298	0.713	1.173	2.596
20066	District 4	4	4	1.170	0.000	0.000	0.000	0.000
20086	District 2	1	1	0.000	0.000	0.000	7.992	0.000
20106	District 1	10	4	0.380	0.000	1.276	5.006	0.000
20399	District 2	65	15	1.888	0.000	0.489	0.000	0.000
20401	District 2	158	69	1.402	0.000	0.744	0.579	0.859
20415	District 3	330	139	1.045	0.000	1.031	0.689	0.327
20466	District 2	17	14	0.843	8.598	1.222	0.571	0.000
20466	District 3	29	21	1.276	0.000	0.471	0.000	0.000
20560	District 1	11	6	1.266	0.000	0.851	0.000	0.000
20560	District 4	134	89	1.091	0.000	0.637	0.290	0.000
20692	District 1	41	19	1.200	0.000	0.537	1.054	0.000
20771	District 3	17	17	0.830	0.000	1.454	1.878	0.000
20784	District 4	9	4	1.170	0.000	0.000	0.000	0.000
20891	District 7	96	16	1.080	0.000	0.000	1.685	0.000
21213	District 7	54	8	0.864	0.000	2.049	3.371	0.000
21282	District 1	7	5	0.608	0.000	0.000	4.005	7.533
21282	District 2	26	15	0.944	0.000	0.978	1.598	0.000
21282	District 3	17	9	0.470	0.000	0.549	8.870	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
21282	District 4	3	3	0.780	0.000	3.779	0.000	0.000
21467	District 1	28	13	1.169	3.926	0.393	0.770	0.000
21750	District 6	123	91	1.118	0.000	0.752	0.466	0.615
21881	District 1	2	1	1.520	0.000	0.000	0.000	0.000
21881	District 6	122	74	1.086	0.000	0.673	0.764	1.514
22228	District 1	5	3	1.013	0.000	1.701	0.000	0.000
22228	District 2	8	2	0.000	0.000	1.222	3.996	0.000
22228	District 4	4	1	1.170	0.000	0.000	0.000	0.000
22228	Lakes District	19	4	0.621	0.000	3.907	0.000	0.000
22228	District 6	3	3	0.893	0.000	2.074	0.000	0.000
22266	District 4	6	5	1.170	0.000	0.000	0.000	0.000
22297	District 3	22	15	1.129	15.753	0.330	0.000	3.029
22304	District 1	32	21	1.085	2.430	0.486	0.954	1.794
22304	District 2	16	13	1.271	0.000	0.940	0.615	0.000
22304	District 3	497	170	0.979	2.780	1.047	1.127	0.535
22304	District 4	15	13	0.810	0.000	1.744	3.971	0.000
22405	District 4	12	12	1.072	0.000	0.000	0.000	4.813
22445	Lakes District	1	1	1.241	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
22445	District 6	2	1	1.339	0.000	0.000	0.000	0.000
22492	District 3	12	4	1.411	0.000	0.000	0.000	0.000
22533	District 1	6	2	0.760	0.000	2.552	0.000	0.000
22623	District 4	4	2	1.170	0.000	0.000	0.000	0.000
22962	District 7	4	1	1.152	0.000	0.000	0.000	0.000
23047	District 1	4	4	1.520	0.000	0.000	0.000	0.000
23047	District 6	16	13	1.030	0.000	0.957	1.087	0.000
23049	District 3	19	10	0.423	0.000	2.472	3.193	0.000
23105	District 2	8	4	0.590	0.000	1.222	1.998	0.000
23338	District 3	76	56	0.957	0.000	0.883	1.996	0.811
23386	District 3	123	55	1.026	0.000	0.809	1.161	1.652
23386	Lakes District	1	1	1.241	0.000	0.000	0.000	0.000
23436	District 1	7	5	1.520	0.000	0.000	0.000	0.000
23493	District 1	2	1	0.000	51.032	0.000	0.000	0.000
23641	District 1	44	15	0.608	0.000	1.361	3.338	0.000
23641	District 2	36	9	1.311	0.000	0.543	1.776	0.000
23641	District 3	43	8	1.411	0.000	0.000	0.000	0.000
23641	District 4	24	4	0.292	0.000	2.834	6.452	14.440

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
23641	Lakes District	19	3	0.827	0.000	2.605	0.000	0.000
23710	District 1	2	2	1.520	0.000	0.000	0.000	0.000
23710	District 6	4	4	1.339	0.000	0.000	0.000	0.000
23853	District 2	76	50	1.039	0.000	1.173	0.320	1.185
24056	District 2	35	29	0.977	0.000	1.096	0.827	1.022
24085	District 3	63	31	0.910	7.623	0.957	1.030	2.932
24361	District 1	5	2	0.760	0.000	2.552	0.000	0.000
24525	District 1	11	2	0.760	0.000	0.000	5.006	0.000
24525	Lakes District	64	3	0.827	0.000	2.605	0.000	0.000
24674	District 2	89	36	1.115	0.000	1.086	0.444	0.823
24742	District 6	8	7	0.957	0.000	1.778	0.000	0.000
24917	District 3	14	9	1.097	0.000	1.099	0.000	0.000
24931	District 7	23	15	0.998	0.000	2.186	0.000	0.000
24963	District 1	14	11	0.967	0.000	1.392	0.910	0.000
24963	District 6	1	1	1.339	0.000	0.000	0.000	0.000
24978	District 3	27	26	0.922	0.000	1.141	0.614	3.496
25046	District 1	5	2	1.520	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
25046	Lakes District	7	1	1.241	0.000	0.000	0.000	0.000
25234	District 7	72	28	0.946	0.000	1.171	2.889	0.000
25248	District 1	3	1	1.520	0.000	0.000	0.000	0.000
25248	District 6	17	8	1.172	0.000	0.000	1.766	0.000
25471	District 3	9	8	1.058	0.000	0.618	0.000	5.680
25535	District 4	42	33	0.957	0.000	1.374	1.564	0.000
25628	District 1	84	53	0.975	0.000	0.963	1.511	0.711
25886	District 2	4	4	1.770	0.000	0.611	0.000	0.000
25886	District 3	3	2	0.705	0.000	2.472	0.000	0.000
25886	District 4	177	38	1.077	0.000	0.597	0.679	0.000
26121	District 2	90	16	0.738	0.000	0.917	2.497	0.000
26165	District 3	7	5	0.846	0.000	0.989	3.193	0.000
26355	District 4	4	4	1.170	0.000	0.000	0.000	0.000
26527	District 2	1	1	2.360	0.000	0.000	0.000	0.000
26527	District 4	35	28	1.044	0.000	0.405	1.843	0.000
26634	District 4	45	30	0.936	0.000	1.889	0.000	1.925
26796	District 4	22	17	0.826	0.000	1.334	4.554	0.000
26796	District 7	100	28	0.781	2.133	2.927	2.889	0.000
26947	District 6	24	13	1.030	0.000	1.436	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
27173	District 1	3	2	0.760	0.000	2.552	0.000	0.000
27173	District 2	1	1	2.360	0.000	0.000	0.000	0.000
27173	District 3	4	1	1.411	0.000	0.000	0.000	0.000
27173	District 4	3	2	0.000	0.000	5.668	12.904	0.000
27173	Lakes District	2	2	0.621	0.000	3.907	0.000	0.000
27188	District 1	37	24	1.076	2.126	1.063	0.000	1.569
27198	District 2	9	5	0.000	0.000	2.444	0.000	0.000
27199	District 3	30	27	0.940	0.000	1.282	0.591	1.683
27236	District 1	50	4	0.760	0.000	0.000	5.006	0.000
27236	District 6	460	94	0.855	5.362	1.522	1.052	1.191
27327	District 2	94	38	0.745	0.000	0.900	2.313	0.780
27394	District 6	7	7	0.765	0.000	0.000	2.019	16.000
27537	District 1	39	25	1.277	2.041	0.204	0.000	3.013
27537	District 6	41	21	1.084	0.000	1.185	0.000	0.000
27671	District 1	4	4	1.140	0.000	1.276	0.000	0.000
27671	District 3	20	12	0.588	0.000	2.472	1.331	0.000
27690	District 1	11	4	0.760	0.000	2.552	0.000	0.000
27704	District 3	26	23	0.859	0.000	1.290	1.388	1.976
27866	District 1	6	3	0.507	0.000	3.402	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
27876	District 2	143	81	1.224	1.486	0.966	0.493	0.366
27996	District 1	6	6	1.013	0.000	0.851	1.669	0.000
27996	District 4	84	61	1.055	0.000	0.743	0.846	0.000
28010	District 2	1	1	0.000	0.000	2.444	0.000	0.000
28010	District 3	6	5	0.564	0.000	1.977	3.193	0.000
28214	District 3	2	1	1.411	0.000	0.000	0.000	0.000
28214	District 4	1	1	0.000	0.000	11.336	0.000	0.000
28219	District 1	2	1	1.520	0.000	0.000	0.000	0.000
28219	District 6	31	13	0.618	0.000	2.393	2.174	0.000
28286	District 1	109	65	1.029	1.570	1.178	0.462	0.579
28286	Lakes District	11	7	1.064	0.000	1.116	0.000	0.000
28286	District 6	2	2	0.670	0.000	0.000	7.065	0.000
28404	District 2	41	33	1.216	0.000	0.815	0.727	1.796
28460	District 1	1	1	1.520	0.000	0.000	0.000	0.000
28572	District 4	69	54	0.931	0.000	1.679	1.434	0.000
28649	District 1	5	4	1.140	0.000	0.000	2.503	0.000
28649	Lakes District	12	10	0.869	0.000	1.563	2.638	0.000
28656	District 2	10	6	0.787	0.000	1.222	1.332	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
28656	District 3	26	18	1.019	0.000	0.824	1.774	0.000
28656	District 4	15	10	1.053	0.000	1.134	0.000	0.000
28658	District 1	23	19	1.040	0.000	0.269	2.108	1.982
28658	District 2	19	14	1.012	0.000	0.873	1.713	0.000
28658	District 3	21	9	1.097	0.000	0.000	3.548	0.000
28658	District 4	110	77	1.079	0.000	0.442	0.670	0.750
28658	Lakes District	14	9	1.103	0.000	0.868	0.000	0.000
28738	District 1	16	1	1.520	0.000	0.000	0.000	0.000
28738	District 4	8	1	1.170	0.000	0.000	0.000	0.000
28738	Lakes District	16	1	1.241	0.000	0.000	0.000	0.000
28761	District 2	18	16	1.033	0.000	0.917	1.498	0.000
28820	District 1	10	6	1.013	0.000	1.701	0.000	0.000
28820	District 6	121	96	1.060	5.250	0.713	0.589	1.750
28854	District 2	15	8	1.180	0.000	1.222	0.000	0.000
28868	District 1	3	3	0.507	0.000	1.701	3.338	0.000
28868	District 6	33	20	1.004	0.000	1.244	0.707	0.000
28919	District 2	17	14	1.180	0.000	0.873	0.000	4.233
29112	District 2	12	8	2.065	0.000	0.306	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
29165	District 6	333	21	1.148	0.000	0.889	0.000	0.000
29319	District 4	13	12	0.975	0.000	0.945	2.151	0.000
29325	District 4	39	17	0.894	0.000	0.667	3.036	3.398
29330	District 3	2	2	0.705	0.000	2.472	0.000	0.000
29407	District 2	19	9	1.311	0.000	1.086	0.000	0.000
29407	District 3	37	10	0.705	0.000	1.977	0.000	4.544
29783	District 1	72	47	1.099	0.000	1.303	0.000	0.801
29834	District 2	14	5	1.416	0.000	0.000	3.197	0.000
29834	District 3	15	3	0.940	0.000	1.648	0.000	0.000
29834	District 4	4	4	0.292	0.000	5.668	0.000	14.440
29834	Lakes District	6	3	1.241	0.000	0.000	0.000	0.000
30050	District 1	4	2	0.760	0.000	2.552	0.000	0.000
30050	District 2	73	13	0.545	9.260	1.128	1.844	0.000
30050	District 3	48	7	1.209	0.000	0.706	0.000	0.000
30050	Lakes District	5	1	1.241	0.000	0.000	0.000	0.000
30053	District 2	18	6	0.787	0.000	0.000	3.996	4.938
30147	District 1	18	11	0.967	4.639	0.464	1.820	0.000
32001	District 3	5	4	1.058	0.000	0.000	3.992	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Warnings by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
32026	District 1	1	1	1.520	0.000	0.000	0.000	0.000
32033	District 3	2	2	1.411	0.000	0.000	0.000	0.000
32084	District 3	1	1	1.411	0.000	0.000	0.000	0.000
32084	District 4	116	75	1.092	0.000	0.453	0.688	0.000
32107	District 3	26	18	0.940	0.000	1.099	0.887	2.525
32112	District 1	244	145	0.880	1.408	1.091	1.243	2.078
32112	District 2	10	4	1.180	0.000	0.611	1.998	0.000
32112	District 3	4	2	0.705	0.000	0.000	0.000	22.721
32112	District 4	13	13	0.900	0.000	0.872	0.000	8.886
32112	Lakes District	3	1	1.241	0.000	0.000	0.000	0.000
32117	District 2	103	80	0.413	3.009	1.528	1.099	1.111
32125	District 1	1	1	1.520	0.000	0.000	0.000	0.000
32136	District 1	2	1	1.520	0.000	0.000	0.000	0.000
32139	District 2	1	1	0.000	0.000	2.444	0.000	0.000
32149	District 2	6	2	1.180	0.000	1.222	0.000	0.000

Appendix E. Post-Stop Outcome – Arrest, Deputy-District Comparison Ratio

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
36	District 1	25	3	0.657	0.000	1.190	2.186	0.000
483	District 7	77	1	1.359	0.000	0.000	0.000	0.000
516	District 4	17	1	1.193	0.000	0.000	0.000	0.000
537	District 1	9	1	0.000	0.000	3.570	0.000	0.000
537	Lakes District	2	1	1.644	0.000	0.000	0.000	0.000
692	District 6	103	1	0.000	0.000	3.491	0.000	0.000
941	District 7	113	5	0.815	3.533	1.325	0.000	0.000
996	District 2	39	3	1.189	0.000	0.651	1.889	0.000
2041	District 7	42	2	1.359	0.000	0.000	0.000	0.000
2539	District 3	160	1	1.818	0.000	0.000	0.000	0.000
2553	District 2	74	4	0.000	0.000	1.953	0.000	0.000
2949	District 3	40	4	1.364	0.000	0.000	2.500	0.000
2953	District 3	73	4	0.455	0.000	0.753	2.500	23.333
3069	District 7	79	1	0.000	0.000	6.625	0.000	0.000
3074	District 1	83	11	1.255	2.136	0.974	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
3074	Lakes District	75	11	1.046	0.000	0.776	3.364	0.000
3074	District 7	2	1	1.359	0.000	0.000	0.000	0.000
3076	District 1	51	16	1.109	0.000	0.892	0.820	3.525
3076	District 4	7	3	0.398	0.000	5.667	0.000	0.000
3076	Lakes District	111	23	1.072	0.000	0.990	0.000	0.000
3248	District 1	20	2	1.972	0.000	0.000	0.000	0.000
3326	District 7	44	2	1.359	0.000	0.000	0.000	0.000
3439	District 2	88	1	3.568	0.000	0.000	0.000	0.000
3466	District 2	25	1	0.000	0.000	1.953	0.000	0.000
3604	District 1	40	1	1.972	0.000	0.000	0.000	0.000
3704	District 4	39	2	0.596	0.000	4.250	0.000	0.000
3832	District 1	11	3	1.315	0.000	0.000	2.186	0.000
3832	District 2	82	9	0.793	0.000	0.868	1.889	0.000
3832	District 3	5	2	1.818	0.000	0.000	0.000	0.000
3832	District 4	3	1	1.193	0.000	0.000	0.000	0.000
3911	District 1	50	1	0.000	0.000	3.570	0.000	0.000
3937	District 2	12	1	0.000	0.000	1.953	0.000	0.000
4299	District 2	482	28	1.147	1.474	0.976	0.607	5.161

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
4700	District 2	34	1	0.000	0.000	1.953	0.000	0.000
4700	District 3	201	17	1.176	0.000	1.063	0.000	0.000
4700	Lakes District	27	2	1.644	0.000	0.000	0.000	0.000
5714	District 2	77	4	0.000	0.000	0.976	2.833	0.000
6062	District 6	50	1	1.829	0.000	0.000	0.000	0.000
6170	District 1	115	10	0.986	4.700	0.714	0.656	0.000
6223	District 4	8	1	1.193	0.000	0.000	0.000	0.000
6233	District 1	12	2	0.986	0.000	1.785	0.000	0.000
6233	District 6	44	1	1.829	0.000	0.000	0.000	0.000
6244	District 2	78	2	0.000	0.000	0.976	2.833	0.000
6244	District 3	38	1	1.818	0.000	0.000	0.000	0.000
6244	District 4	5	1	1.193	0.000	0.000	0.000	0.000
6244	Lakes District	11	1	0.000	0.000	2.846	0.000	0.000
6308	District 1	6	1	0.000	0.000	3.570	0.000	0.000
6325	District 1	10	2	1.972	0.000	0.000	0.000	0.000
7060	District 3	4	2	1.818	0.000	0.000	0.000	0.000
7060	District 4	215	7	0.852	0.000	2.429	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
7060	Lakes District	71	3	1.644	0.000	0.000	0.000	0.000
7070	District 2	56	3	0.000	0.000	1.302	1.889	0.000
7274	District 1	27	2	0.986	0.000	1.785	0.000	0.000
7274	District 6	281	14	1.306	0.000	0.499	0.914	0.000
7309	District 2	136	8	2.676	0.000	0.244	0.708	0.000
7309	District 3	178	13	1.399	0.000	0.463	0.000	7.179
7309	District 4	9	1	1.193	0.000	0.000	0.000	0.000
7309	Lakes District	45	1	0.000	0.000	2.846	0.000	0.000
7337	District 4	73	14	1.193	0.000	0.000	0.000	0.000
7559	District 2	4	1	3.568	0.000	0.000	0.000	0.000
7682	District 2	69	9	0.793	9.175	0.434	1.889	0.000
7696	District 1	4	1	1.972	0.000	0.000	0.000	0.000
7696	District 6	68	9	1.422	0.000	0.388	0.711	0.000
7872	District 2	181	36	1.784	1.147	0.759	0.472	0.000
7872	District 3	31	2	0.909	0.000	1.505	0.000	0.000
7918	District 2	129	1	3.568	0.000	0.000	0.000	0.000
7980	District 3	22	1	0.000	0.000	3.011	0.000	0.000
8091	District 7	156	2	1.359	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
8161	District 1	6	2	0.986	0.000	1.785	0.000	0.000
8161	District 2	4	1	0.000	0.000	1.953	0.000	0.000
8161	District 4	8	3	0.795	0.000	2.833	0.000	0.000
8161	District 6	1	1	0.000	0.000	3.491	0.000	0.000
8189	District 1	17	3	0.657	7.833	1.190	0.000	0.000
8265	District 1	17	2	0.000	0.000	1.785	3.279	0.000
8265	District 2	31	1	0.000	0.000	1.953	0.000	0.000
8598	District 2	27	1	0.000	0.000	0.000	5.667	0.000
8729	District 3	32	3	1.212	0.000	1.004	0.000	0.000
8729	Lakes District	31	5	1.316	0.000	0.569	0.000	0.000
8750	District 3	22	4	1.364	0.000	0.753	0.000	0.000
8874	District 1	8	1	0.000	0.000	3.570	0.000	0.000
8874	District 6	128	5	0.731	0.000	2.095	0.000	0.000
8936	District 2	17	1	3.568	0.000	0.000	0.000	0.000
8960	District 1	68	3	1.972	0.000	0.000	0.000	0.000
8997	District 2	31	1	0.000	0.000	1.953	0.000	0.000
9058	District 1	83	11	1.076	0.000	0.974	1.192	0.000
9316	District 1	108	3	1.315	0.000	1.190	0.000	0.000
9329	District 7	51	2	1.359	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
9360	District 2	79	7	1.019	0.000	1.116	0.810	0.000
9453	District 3	65	2	0.909	0.000	1.505	0.000	0.000
10280	District 7	100	3	1.359	0.000	0.000	0.000	0.000
10303	District 3	21	1	1.818	0.000	0.000	0.000	0.000
10318	District 2	16	2	0.000	0.000	0.976	2.833	0.000
10809	District 3	55	5	0.364	0.000	1.204	4.000	0.000
10821	District 1	71	16	1.479	0.000	0.446	0.820	0.000
11010	District 1	58	2	1.972	0.000	0.000	0.000	0.000
11205	District 3	113	5	0.364	0.000	2.409	0.000	0.000
11234	District 1	42	10	1.578	0.000	0.714	0.000	0.000
11234	Lakes District	108	4	0.411	0.000	2.135	0.000	0.000
11511	District 1	18	2	1.972	0.000	0.000	0.000	0.000
11511	Lakes District	4	3	1.096	0.000	0.949	0.000	0.000
11625	District 3	153	7	1.299	0.000	0.860	0.000	0.000
11692	District 4	137	4	1.193	0.000	0.000	0.000	0.000
11714	District 2	10	2	1.784	0.000	0.976	0.000	0.000
11714	District 3	18	7	1.299	0.000	0.000	1.429	13.333
11714	District 4	22	2	1.193	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
11753	District 3	87	19	1.053	0.000	1.109	0.526	0.000
11849	District 2	183	4	0.000	0.000	1.465	1.417	0.000
11869	District 6	84	1	0.000	0.000	3.491	0.000	0.000
12044	District 3	84	7	1.299	0.000	0.430	1.429	0.000
12138	District 3	75	2	0.909	0.000	0.000	5.000	0.000
12153	District 1	10	3	0.000	0.000	1.190	4.372	0.000
12153	District 6	63	16	1.029	0.000	0.873	1.200	0.000
12375	District 2	35	6	0.000	0.000	1.627	0.944	0.000
12514	District 2	54	3	0.000	0.000	1.302	0.000	48.167
12735	District 1	10	2	1.972	0.000	0.000	0.000	0.000
12735	District 7	71	1	1.359	0.000	0.000	0.000	0.000
13113	District 7	115	2	1.359	0.000	0.000	0.000	0.000
13159	District 4	107	3	0.000	0.000	2.833	22.667	0.000
13159	Lakes District	125	3	0.548	0.000	1.897	0.000	0.000
13159	District 7	65	2	0.679	0.000	3.313	0.000	0.000
13331	District 1	25	2	0.000	0.000	1.785	3.279	0.000
13331	District 2	12	1	0.000	0.000	1.953	0.000	0.000
13331	District 3	254	17	0.749	0.000	1.063	2.353	0.000
13579	District 3	38	1	1.818	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
13722	District 1	32	2	0.986	0.000	1.785	0.000	0.000
13722	District 2	175	23	1.396	0.000	0.679	1.478	0.000
13946	District 3	18	1	1.818	0.000	0.000	0.000	0.000
14241	District 2	178	9	1.586	0.000	1.085	0.000	0.000
14271	District 4	34	2	1.193	0.000	0.000	0.000	0.000
14711	District 1	72	4	0.986	0.000	1.785	0.000	0.000
14730	District 1	203	5	0.789	0.000	1.428	1.312	0.000
14730	District 6	897	25	0.951	0.000	0.977	1.280	0.000
14941	District 2	112	3	0.000	13.762	1.302	0.000	0.000
14965	District 3	1	1	0.000	0.000	3.011	0.000	0.000
15221	District 2	31	1	3.568	0.000	0.000	0.000	0.000
15326	District 6	230	6	1.219	0.000	0.582	1.067	0.000
15755	District 4	15	1	1.193	0.000	0.000	0.000	0.000
15760	District 1	34	2	0.986	0.000	1.785	0.000	0.000
15760	District 6	115	1	0.000	0.000	3.491	0.000	0.000
16293	District 2	23	1	0.000	0.000	1.953	0.000	0.000
16431	District 1	20	1	1.972	0.000	0.000	0.000	0.000
16431	District 6	46	2	0.000	0.000	0.000	6.400	0.000
16474	District 3	99	2	0.000	0.000	1.505	5.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
16553	District 3	3	2	0.909	0.000	1.505	0.000	0.000
16563	District 2	31	5	2.141	0.000	0.391	1.133	0.000
16667	District 1	9	1	0.000	0.000	3.570	0.000	0.000
16690	District 4	172	4	1.193	0.000	0.000	0.000	0.000
17071	District 3	47	4	0.909	0.000	1.505	0.000	0.000
17217	District 3	452	15	1.091	0.000	0.803	1.333	0.000
17295	District 1	15	3	1.315	0.000	0.000	2.186	0.000
17433	District 1	71	9	0.219	0.000	1.983	2.186	0.000
17456	District 4	16	1	0.000	0.000	0.000	34.000	0.000
17456	District 7	158	16	1.019	1.104	0.414	2.208	0.000
17464	District 1	23	8	0.740	2.938	1.785	0.000	0.000
17464	District 6	42	4	1.371	0.000	0.873	0.000	0.000
17534	District 1	2	1	1.972	0.000	0.000	0.000	0.000
17534	District 4	8	1	1.193	0.000	0.000	0.000	0.000
17800	District 1	9	3	0.657	7.833	0.000	2.186	0.000
17800	District 2	35	4	0.892	0.000	0.976	1.417	0.000
17800	District 3	31	10	0.727	0.000	1.505	1.000	0.000
17800	District 4	17	1	1.193	0.000	0.000	0.000	0.000
17800	Lakes District	16	1	0.000	0.000	2.846	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
17842	District 1	22	2	0.986	0.000	0.000	3.279	0.000
17842	Lakes District	11	1	1.644	0.000	0.000	0.000	0.000
17997	District 1	17	2	1.972	0.000	0.000	0.000	0.000
17997	District 6	121	7	1.045	13.714	0.997	0.000	0.000
18131	District 3	32	1	1.818	0.000	0.000	0.000	0.000
18340	District 1	4	1	1.972	0.000	0.000	0.000	0.000
18521	District 4	59	5	1.193	0.000	0.000	0.000	0.000
18530	District 2	19	1	0.000	41.286	0.000	0.000	0.000
18667	District 4	11	1	1.193	0.000	0.000	0.000	0.000
18987	District 4	51	6	1.193	0.000	0.000	0.000	0.000
19310	District 1	49	6	0.000	0.000	1.785	2.186	9.400
19343	District 3	194	18	1.111	0.000	0.836	1.111	0.000
19415	District 4	4	2	0.596	0.000	4.250	0.000	0.000
19529	District 1	245	21	0.657	0.000	1.530	1.249	2.686
19640	District 7	238	5	0.815	3.533	1.325	0.000	0.000
20059	District 2	58	3	1.189	0.000	1.302	0.000	0.000
20106	District 1	10	1	0.000	0.000	3.570	0.000	0.000
20106	Lakes District	4	1	0.000	0.000	2.846	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
20401	District 2	158	20	1.070	0.000	0.879	1.417	0.000
20401	District 3	2	1	0.000	0.000	3.011	0.000	0.000
20415	District 3	330	12	1.212	0.000	0.753	0.833	0.000
20466	District 2	17	1	0.000	0.000	1.953	0.000	0.000
20560	District 1	11	3	1.315	0.000	1.190	0.000	0.000
20560	District 4	134	16	0.969	0.000	0.531	0.000	8.500
20692	District 1	41	4	0.493	0.000	0.892	3.279	0.000
20784	District 4	9	4	0.895	0.000	2.125	0.000	0.000
20891	District 7	96	1	0.000	0.000	6.625	0.000	0.000
21282	District 1	7	1	0.000	0.000	3.570	0.000	0.000
21282	District 2	26	3	0.000	0.000	0.651	3.778	0.000
21282	District 3	17	2	0.909	0.000	1.505	0.000	0.000
21467	District 1	28	2	0.000	11.750	0.000	3.279	0.000
21750	District 6	123	2	0.000	0.000	3.491	0.000	0.000
21881	District 6	122	3	1.219	0.000	0.000	2.133	0.000
22228	District 1	5	1	1.972	0.000	0.000	0.000	0.000
22228	District 2	8	1	0.000	0.000	1.953	0.000	0.000
22228	District 4	4	1	1.193	0.000	0.000	0.000	0.000
22228	Lakes District	19	2	0.822	0.000	1.423	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
22297	District 2	1	1	0.000	0.000	0.000	5.667	0.000
22297	District 3	22	6	1.515	0.000	0.000	1.667	0.000
22304	District 1	32	1	0.000	0.000	0.000	0.000	56.400
22304	District 2	16	1	0.000	0.000	1.953	0.000	0.000
22304	District 3	497	39	0.839	7.179	1.235	0.769	0.000
22304	District 4	15	1	1.193	0.000	0.000	0.000	0.000
22623	District 4	4	1	1.193	0.000	0.000	0.000	0.000
22962	District 7	4	1	1.359	0.000	0.000	0.000	0.000
23049	District 3	19	2	0.909	0.000	1.505	0.000	0.000
23105	District 2	8	1	0.000	0.000	1.953	0.000	0.000
23338	District 3	76	3	0.000	0.000	2.007	3.333	0.000
23386	District 3	123	11	0.661	0.000	1.642	0.909	0.000
23641	District 1	44	6	0.329	0.000	2.380	1.093	0.000
23641	District 2	36	11	0.649	0.000	1.420	0.515	0.000
23641	District 4	24	5	0.954	0.000	1.700	0.000	0.000
23641	Lakes District	19	2	0.000	37.000	1.423	0.000	0.000
23853	District 2	76	3	0.000	0.000	1.953	0.000	0.000
24056	District 2	35	1	0.000	0.000	1.953	0.000	0.000
24085	District 3	63	6	0.909	0.000	1.004	1.667	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
24361	District 1	5	1	1.972	0.000	0.000	0.000	0.000
24361	Lakes District	2	1	0.000	0.000	0.000	37.000	0.000
24525	Lakes District	64	2	1.644	0.000	0.000	0.000	0.000
24674	District 2	89	5	1.427	0.000	0.781	1.133	0.000
24963	District 1	14	2	0.986	0.000	0.000	0.000	28.200
25046	District 1	5	2	0.986	0.000	1.785	0.000	0.000
25046	District 2	2	1	3.568	0.000	0.000	0.000	0.000
25234	District 7	72	2	0.679	0.000	3.313	0.000	0.000
25248	District 6	17	1	0.000	0.000	3.491	0.000	0.000
25535	District 4	42	2	0.000	0.000	8.500	0.000	0.000
25886	District 3	3	1	0.000	0.000	3.011	0.000	0.000
25886	District 4	177	1	0.000	0.000	8.500	0.000	0.000
26121	District 2	90	19	0.751	2.173	0.925	1.491	0.000
26634	District 4	45	4	1.193	0.000	0.000	0.000	0.000
26796	District 7	100	4	0.679	0.000	1.656	4.417	0.000
26947	District 6	24	1	0.000	0.000	0.000	6.400	0.000
27173	District 3	4	1	1.818	0.000	0.000	0.000	0.000
27173	District 4	3	1	1.193	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
27188	District 1	37	1	1.972	0.000	0.000	0.000	0.000
27236	District 1	50	8	0.740	0.000	1.785	0.820	0.000
27236	District 6	460	79	0.972	1.215	1.016	1.053	0.000
27327	District 2	94	8	0.000	0.000	1.220	2.125	0.000
27537	District 1	39	1	0.000	23.500	0.000	0.000	0.000
27537	District 6	41	3	0.610	0.000	2.327	0.000	0.000
27690	District 1	11	2	0.986	0.000	0.000	3.279	0.000
27704	District 3	26	1	0.000	0.000	3.011	0.000	0.000
27876	District 2	143	7	0.000	0.000	1.674	0.810	0.000
27996	District 4	84	8	1.193	0.000	0.000	0.000	0.000
28286	District 1	109	18	1.315	0.000	0.992	0.364	0.000
28286	Lakes District	11	2	0.822	0.000	1.423	0.000	0.000
28404	District 2	41	1	0.000	0.000	1.953	0.000	0.000
28572	District 4	69	5	0.954	0.000	1.700	0.000	0.000
28649	Lakes District	12	1	1.644	0.000	0.000	0.000	0.000
28656	District 3	26	1	1.818	0.000	0.000	0.000	0.000
28656	District 4	15	1	1.193	0.000	0.000	0.000	0.000
28658	District 2	19	3	1.189	0.000	1.302	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
28658	District 3	21	3	0.606	0.000	1.004	3.333	0.000
28658	District 4	110	5	1.193	0.000	0.000	0.000	0.000
28658	Lakes District	14	1	1.644	0.000	0.000	0.000	0.000
28738	District 1	16	4	1.479	0.000	0.892	0.000	0.000
28738	Lakes District	16	2	0.822	0.000	1.423	0.000	0.000
28820	District 6	121	3	1.219	0.000	0.000	2.133	0.000
28868	District 6	33	1	1.829	0.000	0.000	0.000	0.000
29165	District 6	333	5	1.097	0.000	1.396	0.000	0.000
29319	District 4	13	1	1.193	0.000	0.000	0.000	0.000
29325	District 3	3	1	0.000	0.000	0.000	10.000	0.000
29325	District 4	39	5	0.954	0.000	0.000	6.800	0.000
29407	District 3	37	4	1.364	0.000	0.753	0.000	0.000
29783	District 1	72	11	1.434	0.000	0.649	0.596	0.000
29834	District 2	14	1	0.000	0.000	1.953	0.000	0.000
29834	District 3	15	2	0.909	0.000	1.505	0.000	0.000
30050	District 1	4	1	1.972	0.000	0.000	0.000	0.000
30050	District 2	73	5	0.714	0.000	1.562	0.000	0.000
30050	District 3	48	3	1.212	0.000	1.004	0.000	0.000

Deputy ID	District	Deputy's Total Stops By District	Deputy's Arrests by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
30147	District 1	18	2	0.986	0.000	1.785	0.000	0.000
32012	District 2	1	1	0.000	0.000	1.953	0.000	0.000
32017	District 4	1	1	1.193	0.000	0.000	0.000	0.000
32084	District 4	116	7	1.023	0.000	1.214	0.000	0.000
32112	District 1	244	21	0.751	4.476	0.000	2.811	0.000
32112	District 2	10	2	0.000	0.000	0.976	2.833	0.000
32112	Lakes District	3	1	1.644	0.000	0.000	0.000	0.000
32139	District 2	1	1	0.000	0.000	1.953	0.000	0.000

Appendix F. Post-Stop Outcome – Search, Deputy-District Comparison Ratio

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
36	District 1	25	4	1.011	0.000	0.892	1.379	0.000
941	District 7	113	4	0.722	3.250	1.300	0.000	0.000
996	District 2	39	1	5.000	0.000	0.000	0.000	0.000
2041	District 7	42	1	1.444	0.000	0.000	0.000	0.000
2306	District 3	60	1	0.000	0.000	2.854	0.000	0.000
2539	District 3	160	1	1.957	0.000	0.000	0.000	0.000
2553	District 2	74	1	0.000	0.000	1.774	0.000	0.000
2953	District 3	73	3	0.652	0.000	0.000	2.854	15.222
2977	District 2	67	1	0.000	0.000	0.000	5.238	0.000
3069	District 7	79	1	0.000	0.000	5.200	0.000	0.000
3074	District 1	83	10	1.213	2.600	1.071	0.000	0.000
3074	Lakes District	75	6	1.159	0.000	0.889	0.000	0.000
3074	District 7	2	1	1.444	0.000	0.000	0.000	0.000
3076	District 1	51	7	1.156	0.000	0.510	1.576	0.000
3076	District 4	7	1	0.000	0.000	7.273	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
3076	Lakes District	111	14	0.994	0.000	1.143	0.000	0.000
3248	District 1	20	3	1.348	0.000	1.190	0.000	0.000
3466	District 2	25	3	0.000	0.000	1.183	0.000	18.333
3487	District 2	20	1	5.000	0.000	0.000	0.000	0.000
3704	District 4	39	1	0.000	0.000	7.273	0.000	0.000
3746	District 3	31	2	0.000	0.000	1.427	4.281	0.000
3832	District 1	11	2	2.022	0.000	0.000	0.000	0.000
3832	District 2	82	7	0.714	0.000	0.760	2.245	0.000
3832	District 3	5	2	1.957	0.000	0.000	0.000	0.000
3832	District 4	3	1	1.212	0.000	0.000	0.000	0.000
4299	District 2	482	7	3.571	5.238	0.253	0.000	0.000
4700	District 2	34	1	0.000	0.000	1.774	0.000	0.000
4700	District 3	201	9	1.305	0.000	0.951	0.000	0.000
4700	Lakes District	27	1	1.739	0.000	0.000	0.000	0.000
5502	District 3	21	2	0.979	0.000	0.000	0.000	22.833
5714	District 2	77	6	0.000	0.000	1.183	1.746	0.000
6170	District 1	115	4	1.517	0.000	0.892	0.000	0.000
6170	District 2	1	1	0.000	0.000	1.774	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
6223	District 4	8	1	1.212	0.000	0.000	0.000	0.000
6233	District 1	12	1	2.022	0.000	0.000	0.000	0.000
6325	District 1	10	1	2.022	0.000	0.000	0.000	0.000
7060	District 4	215	6	1.212	0.000	0.000	0.000	0.000
7060	Lakes District	71	3	1.159	0.000	0.889	0.000	0.000
7274	District 6	281	1	0.000	0.000	0.000	9.200	0.000
7309	District 1	1	1	0.000	0.000	3.569	0.000	0.000
7309	District 2	136	1	5.000	0.000	0.000	0.000	0.000
7309	District 3	178	1	1.957	0.000	0.000	0.000	0.000
7309	Lakes District	45	1	0.000	0.000	2.667	0.000	0.000
7323	District 1	9	1	2.022	0.000	0.000	0.000	0.000
7337	District 4	73	14	1.212	0.000	0.000	0.000	0.000
7559	District 2	4	1	5.000	0.000	0.000	0.000	0.000
7682	District 2	69	1	0.000	0.000	0.000	5.238	0.000
7696	District 6	68	1	1.704	0.000	0.000	0.000	0.000
7872	District 2	181	4	1.250	0.000	1.331	0.000	0.000
7980	District 3	22	1	0.000	0.000	2.854	0.000	0.000
8161	District 4	8	1	1.212	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
8189	District 1	17	5	0.809	5.200	1.427	0.000	0.000
8265	District 2	31	1	0.000	0.000	1.774	0.000	0.000
8598	District 2	27	1	0.000	0.000	0.000	5.238	0.000
8729	District 1	4	1	0.000	0.000	0.000	5.515	0.000
8729	District 3	32	1	1.957	0.000	0.000	0.000	0.000
8729	Lakes District	31	2	0.870	0.000	1.333	0.000	0.000
8750	District 3	22	4	1.468	0.000	0.714	0.000	0.000
8874	District 1	8	1	0.000	0.000	3.569	0.000	0.000
8874	District 6	128	4	0.852	0.000	1.643	0.000	0.000
8936	District 2	17	1	5.000	0.000	0.000	0.000	0.000
8960	District 1	68	2	2.022	0.000	0.000	0.000	0.000
9058	District 1	83	1	2.022	0.000	0.000	0.000	0.000
9316	District 1	108	2	2.022	0.000	0.000	0.000	0.000
9360	District 2	79	3	1.667	0.000	0.591	1.746	0.000
10280	District 7	100	1	0.000	13.000	0.000	0.000	0.000
10318	District 2	16	2	0.000	0.000	0.887	2.619	0.000
10809	District 3	55	1	0.000	0.000	2.854	0.000	0.000
10821	District 1	71	8	1.517	0.000	0.892	0.000	0.000
11010	District 1	58	3	1.348	0.000	1.190	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
11205	District 3	113	4	0.000	0.000	2.854	0.000	0.000
11234	Lakes District	108	2	0.000	0.000	2.667	0.000	0.000
11511	District 1	18	1	2.022	0.000	0.000	0.000	0.000
11625	District 3	153	4	1.468	0.000	0.714	0.000	0.000
11692	District 4	137	3	1.212	0.000	0.000	0.000	0.000
11753	District 3	87	12	1.142	0.000	0.951	0.714	0.000
12138	District 3	75	2	1.957	0.000	0.000	0.000	0.000
12153	District 1	10	1	0.000	0.000	3.569	0.000	0.000
12153	District 6	63	3	1.704	0.000	0.000	0.000	0.000
12514	District 2	54	2	0.000	0.000	0.887	0.000	27.500
12735	District 1	10	1	2.022	0.000	0.000	0.000	0.000
12735	District 7	71	2	1.444	0.000	0.000	0.000	0.000
13113	District 7	115	1	1.444	0.000	0.000	0.000	0.000
13159	District 4	107	2	0.000	0.000	7.273	0.000	0.000
13159	Lakes District	125	2	0.870	0.000	1.333	0.000	0.000
13331	District 1	25	3	0.000	0.000	1.190	3.677	0.000
13331	District 2	12	1	0.000	0.000	1.774	0.000	0.000
13331	District 3	254	12	0.652	0.000	0.951	2.854	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
13722	District 1	32	1	2.022	0.000	0.000	0.000	0.000
13722	District 2	175	10	1.500	0.000	0.887	1.048	0.000
13722	District 3	5	1	0.000	0.000	0.000	8.563	0.000
13946	District 3	18	1	0.000	0.000	2.854	0.000	0.000
14711	District 1	72	7	0.578	0.000	2.549	0.000	0.000
14730	District 1	203	1	0.000	0.000	0.000	5.515	0.000
14730	District 6	897	8	1.065	0.000	0.821	1.150	0.000
14772	District 2	3	1	5.000	0.000	0.000	0.000	0.000
14941	District 2	112	2	0.000	18.333	0.000	2.619	0.000
15221	District 2	31	1	5.000	0.000	0.000	0.000	0.000
15326	District 6	230	2	1.704	0.000	0.000	0.000	0.000
15755	District 4	15	1	1.212	0.000	0.000	0.000	0.000
15760	District 1	34	1	2.022	0.000	0.000	0.000	0.000
16293	District 2	23	1	0.000	0.000	1.774	0.000	0.000
16474	District 3	99	1	0.000	0.000	2.854	0.000	0.000
16553	District 3	3	2	0.979	0.000	1.427	0.000	0.000
16563	District 2	31	4	2.500	0.000	0.444	1.310	0.000
16667	District 1	9	1	0.000	0.000	0.000	5.515	0.000
16690	District 4	172	1	1.212	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
17071	District 3	47	1	1.957	0.000	0.000	0.000	0.000
17217	District 3	452	11	0.890	0.000	1.038	1.557	0.000
17295	District 1	15	2	1.011	0.000	0.000	2.758	0.000
17433	District 1	71	6	0.337	0.000	1.784	1.838	0.000
17456	District 4	16	1	0.000	0.000	0.000	80.000	0.000
17456	District 7	158	7	1.238	0.000	0.743	0.000	0.000
17464	District 1	23	1	0.000	0.000	3.569	0.000	0.000
17464	District 6	42	4	1.278	0.000	0.821	0.000	0.000
17800	District 1	9	2	1.011	0.000	0.000	2.758	0.000
17800	District 2	35	1	0.000	0.000	1.774	0.000	0.000
17800	District 3	31	1	0.000	0.000	2.854	0.000	0.000
17800	District 4	17	1	1.212	0.000	0.000	0.000	0.000
17800	Lakes District	16	1	0.000	0.000	0.000	0.000	40.000
17997	District 1	17	2	2.022	0.000	0.000	0.000	0.000
17997	District 6	121	3	1.704	0.000	0.000	0.000	0.000
18131	District 3	32	1	1.957	0.000	0.000	0.000	0.000
18521	District 4	59	2	1.212	0.000	0.000	0.000	0.000
18667	District 4	11	1	1.212	0.000	0.000	0.000	0.000
18987	District 4	51	4	1.212	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
19310	District 1	49	6	0.000	0.000	2.379	1.838	0.000
19343	District 3	194	5	1.174	0.000	1.142	0.000	0.000
19415	District 4	4	2	0.606	0.000	3.636	0.000	0.000
19529	District 1	245	11	0.735	0.000	1.622	1.003	0.000
20059	District 2	58	3	1.667	0.000	1.183	0.000	0.000
20106	District 1	10	1	0.000	0.000	3.569	0.000	0.000
20399	District 2	65	2	0.000	0.000	1.774	0.000	0.000
20401	District 2	158	1	0.000	0.000	1.774	0.000	0.000
20401	District 3	2	1	0.000	0.000	2.854	0.000	0.000
20415	District 3	330	8	0.979	0.000	1.427	0.000	0.000
20466	District 2	17	1	0.000	0.000	1.774	0.000	0.000
20560	District 1	11	2	2.022	0.000	0.000	0.000	0.000
20560	District 4	134	7	0.693	0.000	1.039	0.000	11.429
20692	District 1	41	3	0.674	0.000	0.000	3.677	0.000
20784	District 4	9	2	1.212	0.000	0.000	0.000	0.000
20891	District 7	96	1	0.000	0.000	5.200	0.000	0.000
21282	District 2	26	2	0.000	0.000	0.887	2.619	0.000
21282	District 3	17	2	0.979	0.000	1.427	0.000	0.000
21467	District 1	28	2	0.000	13.000	0.000	2.758	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
21750	District 6	123	1	0.000	0.000	3.286	0.000	0.000
22228	District 2	8	1	0.000	0.000	0.000	5.238	0.000
22228	District 4	4	1	1.212	0.000	0.000	0.000	0.000
22297	District 3	22	5	1.566	0.000	0.000	1.713	0.000
22304	District 3	497	9	1.305	0.000	0.317	1.903	0.000
22623	District 4	4	1	1.212	0.000	0.000	0.000	0.000
22962	District 7	4	1	1.444	0.000	0.000	0.000	0.000
23049	District 3	19	1	1.957	0.000	0.000	0.000	0.000
23338	District 3	76	4	0.489	0.000	1.427	2.141	0.000
23386	District 3	123	9	0.652	0.000	1.586	0.951	0.000
23641	District 1	44	4	0.000	0.000	2.676	1.379	0.000
23641	District 2	36	5	0.000	0.000	1.774	0.000	0.000
23641	District 4	24	3	0.808	0.000	2.424	0.000	0.000
23853	District 2	76	2	0.000	0.000	1.774	0.000	0.000
24056	District 2	35	1	0.000	0.000	1.774	0.000	0.000
24085	District 3	63	1	1.957	0.000	0.000	0.000	0.000
24361	Lakes District	2	1	0.000	0.000	0.000	40.000	0.000
24525	Lakes District	64	1	1.739	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
24674	District 2	89	2	0.000	0.000	1.774	0.000	0.000
24963	District 1	14	1	0.000	0.000	0.000	0.000	182.000
25046	District 1	5	1	0.000	0.000	3.569	0.000	0.000
25234	District 7	72	3	0.963	0.000	1.733	0.000	0.000
25248	District 6	17	1	0.000	0.000	3.286	0.000	0.000
25535	District 4	42	2	0.000	0.000	7.273	0.000	0.000
25628	District 1	84	1	0.000	0.000	3.569	0.000	0.000
26121	District 2	90	3	0.000	12.222	0.591	1.746	0.000
26634	District 4	45	3	0.808	0.000	2.424	0.000	0.000
26796	District 7	100	3	0.963	0.000	0.000	8.667	0.000
27199	District 3	30	1	1.957	0.000	0.000	0.000	0.000
27236	District 1	50	2	0.000	0.000	1.784	2.758	0.000
27236	District 6	460	14	0.730	0.000	1.173	1.971	0.000
27327	District 2	94	6	0.000	0.000	0.887	2.619	0.000
27537	District 6	41	2	0.000	0.000	3.286	0.000	0.000
27690	District 1	11	1	2.022	0.000	0.000	0.000	0.000
27876	District 2	143	1	0.000	0.000	1.774	0.000	0.000
27996	District 4	84	6	1.212	0.000	0.000	0.000	0.000
28010	District 2	1	1	0.000	0.000	1.774	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
28286	District 1	109	25	1.375	0.000	0.714	0.662	0.000
28286	Lakes District	11	2	0.870	0.000	1.333	0.000	0.000
28404	District 2	41	1	0.000	0.000	1.774	0.000	0.000
28572	District 4	69	3	0.808	0.000	2.424	0.000	0.000
28649	Lakes District	12	1	1.739	0.000	0.000	0.000	0.000
28656	District 2	10	2	0.000	0.000	1.774	0.000	0.000
28656	District 3	26	2	1.957	0.000	0.000	0.000	0.000
28658	District 2	19	3	1.667	0.000	1.183	0.000	0.000
28658	District 3	21	2	0.979	0.000	1.427	0.000	0.000
28658	District 4	110	2	1.212	0.000	0.000	0.000	0.000
28658	Lakes District	14	1	1.739	0.000	0.000	0.000	0.000
28738	District 1	16	2	1.011	0.000	1.784	0.000	0.000
28738	Lakes District	16	1	1.739	0.000	0.000	0.000	0.000
28820	District 6	121	2	1.704	0.000	0.000	0.000	0.000
29319	District 4	13	1	1.212	0.000	0.000	0.000	0.000
29325	District 3	3	1	0.000	0.000	0.000	8.563	0.000
29325	District 4	39	3	1.212	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Searches by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
29407	District 3	37	1	1.957	0.000	0.000	0.000	0.000
29783	District 1	72	11	1.471	0.000	0.649	0.501	0.000
30050	District 2	73	3	0.000	0.000	1.774	0.000	0.000
30147	District 1	18	1	0.000	0.000	3.569	0.000	0.000
32017	District 4	1	1	1.212	0.000	0.000	0.000	0.000
32084	District 4	116	2	1.212	0.000	0.000	0.000	0.000
32107	District 3	26	1	1.957	0.000	0.000	0.000	0.000
32112	District 1	244	21	0.770	4.952	0.170	2.101	0.000
32112	District 2	10	2	0.000	0.000	0.887	2.619	0.000
32112	District 3	4	3	0.000	0.000	1.903	0.000	15.222
32112	Lakes District	3	1	1.739	0.000	0.000	0.000	0.000
32139	District 2	1	1	0.000	0.000	1.774	0.000	0.000

Appendix G. Post-Stop Outcome – Contraband, Deputy-District Comparison Ratio

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
36	District 1	25	3	0.661	0.000	2.760	0.000	0.000
692	District 6	103	2	0.780	0.000	2.589	0.000	0.000
941	District 7	113	1	1.409	0.000	0.000	0.000	0.000
996	District 2	39	2	0.000	0.000	0.933	2.211	0.000
2306	District 3	60	2	0.000	0.000	2.682	0.000	0.000
2539	District 3	160	2	1.000	0.000	1.341	0.000	0.000
2553	District 2	74	2	0.000	0.000	1.867	0.000	0.000
2949	District 3	40	2	1.000	0.000	0.000	0.000	22.800
2953	District 3	73	2	1.000	0.000	0.000	5.182	0.000
3074	District 1	83	11	1.082	4.291	0.753	0.511	0.000
3074	Lakes District	75	3	0.833	0.000	0.000	2.500	0.000
3074	District 7	2	1	1.409	0.000	0.000	0.000	0.000
3076	District 1	51	2	1.983	0.000	0.000	0.000	0.000
3248	District 1	20	2	1.983	0.000	0.000	0.000	0.000
3439	District 2	88	1	5.250	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
3604	District 1	40	1	1.983	0.000	0.000	0.000	0.000
3704	District 4	39	2	0.587	0.000	5.083	0.000	0.000
3746	District 3	31	3	1.333	0.000	0.894	0.000	0.000
3832	District 2	82	4	0.000	0.000	1.400	1.105	0.000
4299	District 2	482	4	3.938	0.000	0.000	0.000	21.000
4497	District 7	296	1	1.409	0.000	0.000	0.000	0.000
4542	District 1	24	1	0.000	0.000	4.140	0.000	0.000
4542	District 6	138	1	1.559	0.000	0.000	0.000	0.000
4700	District 3	201	6	1.333	0.000	0.894	0.000	0.000
5502	District 3	21	1	2.000	0.000	0.000	0.000	0.000
5714	District 2	77	2	0.000	0.000	0.933	2.211	0.000
6170	District 1	115	8	1.239	5.900	0.000	0.702	0.000
6233	District 6	44	1	0.000	0.000	5.179	0.000	0.000
6244	Lakes District	11	1	0.000	0.000	0.000	7.500	0.000
6325	District 1	10	1	1.983	0.000	0.000	0.000	0.000
7060	District 3	4	1	2.000	0.000	0.000	0.000	0.000
7060	District 4	215	9	0.782	0.000	2.259	6.778	0.000
7060	Lakes District	71	3	1.250	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
7070	District 2	56	2	0.000	0.000	1.867	0.000	0.000
7274	District 6	281	11	0.709	8.788	0.942	1.255	0.000
7309	District 3	178	1	2.000	0.000	0.000	0.000	0.000
7323	District 1	9	5	0.397	4.720	0.000	2.248	5.900
7337	District 4	73	4	1.173	0.000	0.000	0.000	0.000
7559	District 2	4	1	5.250	0.000	0.000	0.000	0.000
7682	District 2	69	5	1.050	0.000	1.120	0.884	0.000
7696	District 1	4	1	1.983	0.000	0.000	0.000	0.000
7696	District 6	68	21	1.411	0.000	0.247	0.329	0.000
7872	District 2	181	1	5.250	0.000	0.000	0.000	0.000
7872	District 3	31	1	0.000	0.000	2.682	0.000	0.000
7918	District 2	129	1	5.250	0.000	0.000	0.000	0.000
8091	District 7	156	1	1.409	0.000	0.000	0.000	0.000
8161	District 3	9	1	0.000	0.000	2.682	0.000	0.000
8189	District 1	17	2	0.992	0.000	2.070	0.000	0.000
8265	District 1	17	1	0.000	0.000	4.140	0.000	0.000
8729	Lakes District	31	1	1.250	0.000	0.000	0.000	0.000
8750	District 3	22	5	1.200	0.000	0.536	0.000	9.120
8874	District 6	128	4	0.780	0.000	2.589	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
8960	District 1	68	2	1.983	0.000	0.000	0.000	0.000
8997	District 3	28	2	1.000	0.000	1.341	0.000	0.000
9058	District 1	83	13	0.915	0.000	0.955	1.729	0.000
9316	District 1	108	5	0.793	0.000	0.828	1.124	5.900
9360	District 2	79	1	5.250	0.000	0.000	0.000	0.000
9453	District 3	65	1	0.000	0.000	2.682	0.000	0.000
10303	District 4	9	1	1.173	0.000	0.000	0.000	0.000
10318	District 2	16	1	0.000	0.000	0.000	4.421	0.000
10809	District 3	55	2	1.000	0.000	1.341	0.000	0.000
10821	District 1	71	13	1.678	0.000	0.318	0.432	0.000
11010	District 1	58	5	0.397	0.000	0.828	3.371	0.000
11205	District 3	113	1	2.000	0.000	0.000	0.000	0.000
11234	District 1	42	1	1.983	0.000	0.000	0.000	0.000
11625	District 3	153	4	1.500	0.000	0.671	0.000	0.000
11692	District 4	137	2	1.173	0.000	0.000	0.000	0.000
11753	District 3	87	8	1.250	0.000	0.671	1.295	0.000
12044	District 3	84	4	1.500	0.000	0.671	0.000	0.000
12138	District 3	75	1	2.000	0.000	0.000	0.000	0.000
12153	District 6	63	4	1.169	0.000	1.295	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
12735	District 1	10	1	1.983	0.000	0.000	0.000	0.000
12735	District 7	71	5	1.127	0.000	0.000	1.240	0.000
13113	District 7	115	2	1.409	0.000	0.000	0.000	0.000
13159	District 7	65	1	0.000	0.000	31.000	0.000	0.000
13331	District 1	25	3	0.661	0.000	1.380	1.873	0.000
13331	District 3	254	15	0.800	0.000	1.073	2.073	0.000
13331	District 4	5	1	1.173	0.000	0.000	0.000	0.000
13722	District 2	175	10	1.575	0.000	0.747	1.326	0.000
13946	District 3	18	1	2.000	0.000	0.000	0.000	0.000
14241	District 2	178	2	0.000	0.000	1.867	0.000	0.000
14711	District 1	72	2	1.983	0.000	0.000	0.000	0.000
14730	District 1	203	1	0.000	0.000	4.140	0.000	0.000
14730	District 6	897	1	1.559	0.000	0.000	0.000	0.000
14772	District 2	3	1	5.250	0.000	0.000	0.000	0.000
14941	District 2	112	1	0.000	28.000	0.000	0.000	0.000
15326	District 1	6	1	0.000	0.000	4.140	0.000	0.000
15326	District 6	230	6	1.039	0.000	0.000	2.302	0.000
15755	District 4	15	1	1.173	0.000	0.000	0.000	0.000
15760	District 1	34	7	0.850	0.000	1.183	0.803	4.214

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
15760	District 6	115	11	0.709	0.000	1.412	1.883	0.000
16293	District 2	23	1	0.000	0.000	1.867	0.000	0.000
16431	District 6	46	2	0.780	0.000	0.000	3.452	0.000
16474	District 3	99	1	2.000	0.000	0.000	0.000	0.000
16563	District 2	31	1	0.000	0.000	0.000	4.421	0.000
16667	District 1	9	1	0.000	0.000	0.000	5.619	0.000
16687	District 3	48	1	2.000	0.000	0.000	0.000	0.000
16690	District 4	172	2	1.173	0.000	0.000	0.000	0.000
16996	District 2	82	1	0.000	0.000	1.867	0.000	0.000
17071	District 3	47	4	1.500	0.000	0.671	0.000	0.000
17217	District 3	452	16	1.250	0.000	0.671	1.295	0.000
17295	District 1	15	2	0.992	0.000	0.000	2.810	0.000
17433	District 1	71	7	0.000	0.000	2.957	1.605	0.000
17456	District 1	9	1	0.000	0.000	0.000	5.619	0.000
17456	District 7	158	15	0.752	2.067	0.000	1.653	0.000
17464	District 1	23	4	1.983	0.000	0.000	0.000	0.000
17464	District 6	42	1	0.000	0.000	5.179	0.000	0.000
17800	District 1	9	2	0.992	0.000	0.000	2.810	0.000
17800	District 2	35	2	0.000	0.000	0.933	2.211	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
17800	District 3	31	1	2.000	0.000	0.000	0.000	0.000
17997	District 1	17	1	0.000	0.000	4.140	0.000	0.000
17997	District 6	121	1	1.559	0.000	0.000	0.000	0.000
18521	District 4	59	7	1.173	0.000	0.000	0.000	0.000
18561	District 7	39	1	1.409	0.000	0.000	0.000	0.000
18987	District 4	51	4	1.173	0.000	0.000	0.000	0.000
19065	District 3	1	1	2.000	0.000	0.000	0.000	0.000
19310	District 1	49	13	0.610	0.000	1.592	1.729	0.000
19343	District 3	194	3	1.333	0.000	0.894	0.000	0.000
19415	District 4	4	1	1.173	0.000	0.000	0.000	0.000
19529	District 1	245	41	0.726	0.000	1.818	0.822	1.439
20059	District 2	58	1	5.250	0.000	0.000	0.000	0.000
20415	District 3	330	13	1.077	0.000	1.032	0.797	0.000
20466	District 3	29	1	2.000	0.000	0.000	0.000	0.000
20560	District 1	11	2	0.992	0.000	2.070	0.000	0.000
20560	District 4	134	10	0.821	0.000	1.017	0.000	6.100
20692	District 1	41	4	1.487	0.000	1.035	0.000	0.000
20784	District 4	9	1	1.173	0.000	0.000	0.000	0.000
21213	District 7	54	1	1.409	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
21282	District 2	26	1	0.000	0.000	1.867	0.000	0.000
21282	District 3	17	3	1.333	0.000	0.894	0.000	0.000
21881	District 6	122	2	1.559	0.000	0.000	0.000	0.000
22228	District 4	4	1	1.173	0.000	0.000	0.000	0.000
22297	District 2	1	1	0.000	0.000	0.000	4.421	0.000
22297	District 3	22	5	1.600	0.000	0.000	2.073	0.000
22304	District 1	32	3	0.000	0.000	1.380	0.000	19.667
22304	District 2	16	2	0.000	0.000	0.933	2.211	0.000
22304	District 3	497	88	0.795	2.591	1.189	1.060	1.555
22304	District 4	15	1	1.173	0.000	0.000	0.000	0.000
22623	District 4	4	1	1.173	0.000	0.000	0.000	0.000
23338	District 3	76	2	1.000	0.000	1.341	0.000	0.000
23386	District 3	123	7	0.857	0.000	1.150	1.481	0.000
23641	District 1	44	4	0.496	0.000	2.070	1.405	0.000
23641	District 2	36	5	0.000	0.000	1.867	0.000	0.000
23641	District 4	24	1	0.000	0.000	10.167	0.000	0.000
23853	District 2	76	1	0.000	0.000	1.867	0.000	0.000
24085	District 3	63	3	1.333	0.000	0.894	0.000	0.000
24361	District 1	5	1	1.983	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
24525	Lakes District	64	2	1.250	0.000	0.000	0.000	0.000
24674	District 2	89	1	0.000	0.000	1.867	0.000	0.000
24917	District 3	14	2	0.000	0.000	0.000	10.364	0.000
24963	District 1	14	1	0.000	0.000	0.000	0.000	29.500
25046	District 1	5	1	0.000	0.000	4.140	0.000	0.000
25234	District 7	72	1	1.409	0.000	0.000	0.000	0.000
25248	District 6	17	2	0.780	0.000	2.589	0.000	0.000
25628	District 1	84	1	1.983	0.000	0.000	0.000	0.000
25886	District 3	3	1	0.000	0.000	2.682	0.000	0.000
26121	District 2	90	7	0.750	8.000	0.800	0.632	0.000
26355	District 4	4	1	1.173	0.000	0.000	0.000	0.000
26634	District 4	45	1	0.000	0.000	10.167	0.000	0.000
26796	District 7	100	1	1.409	0.000	0.000	0.000	0.000
26947	District 6	24	1	0.000	0.000	0.000	6.905	0.000
27236	District 1	50	8	1.487	0.000	0.518	0.702	0.000
27236	District 6	460	66	0.969	0.732	1.098	1.046	0.000
27327	District 2	94	7	0.000	0.000	1.333	1.263	0.000
27537	District 1	39	4	0.496	11.800	1.035	0.000	0.000
27537	District 6	41	1	1.559	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
27671	District 3	20	2	0.000	0.000	2.682	0.000	0.000
27690	District 1	11	1	1.983	0.000	0.000	0.000	0.000
27876	District 2	143	3	0.000	0.000	1.244	1.474	0.000
28214	District 3	2	1	0.000	0.000	2.682	0.000	0.000
28286	District 1	109	18	1.432	0.000	0.230	1.249	0.000
28286	Lakes District	11	1	1.250	0.000	0.000	0.000	0.000
28656	District 2	10	2	0.000	0.000	0.933	2.211	0.000
28658	District 4	110	4	1.173	0.000	0.000	0.000	0.000
28658	Lakes District	14	1	1.250	0.000	0.000	0.000	0.000
28738	District 1	16	1	1.983	0.000	0.000	0.000	0.000
28738	Lakes District	16	1	1.250	0.000	0.000	0.000	0.000
28820	District 6	121	3	1.039	0.000	1.726	0.000	0.000
28868	District 6	33	2	1.559	0.000	0.000	0.000	0.000
29165	District 6	333	1	0.000	0.000	0.000	6.905	0.000
29319	District 4	13	1	1.173	0.000	0.000	0.000	0.000
29325	District 3	3	1	0.000	0.000	0.000	10.364	0.000
29325	District 4	39	4	1.173	0.000	0.000	0.000	0.000

Deputy ID	District	Deputy's Total Stops by District	Deputy's Seizures by District	Ratio for Whites	Ratio for Native Americans	Ratio for Hispanics	Ratio for Blacks	Ratio for Asians
29407	District 2	19	1	0.000	0.000	0.000	4.421	0.000
29407	District 3	37	2	2.000	0.000	0.000	0.000	0.000
29783	District 1	72	5	1.587	0.000	0.000	1.124	0.000
30050	District 2	73	2	0.000	0.000	1.867	0.000	0.000
30050	District 3	48	4	0.500	0.000	2.012	0.000	0.000
30050	Lakes District	5	1	0.000	0.000	0.000	0.000	15.000
30053	District 2	18	2	2.625	0.000	0.933	0.000	0.000
32084	District 4	116	1	1.173	0.000	0.000	0.000	0.000
32112	District 1	244	18	1.102	3.933	0.230	1.249	0.000
32112	District 2	10	1	0.000	0.000	0.000	4.421	0.000
32112	Lakes District	3	1	1.250	0.000	0.000	0.000	0.000
32112	District 6	1	1	1.559	0.000	0.000	0.000	0.000
32139	District 2	1	1	0.000	0.000	1.867	0.000	0.000

Appendix H. Random Effect Models Length of Stop

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
28	0	0
36	0	0
371	0	1
483	0	0
516	0	0
537	0	0
692	0	0
941	0	0
996	0	0
1561	0	0
1907	0	0
1980	0	0
2041	0	0
2306	0	0
2539	0	0
2553	0	0
2571	0	0
2618	0	0
2949	1	0
2953	0	0
2969	0	0
2977	0	0
3069	0	0
3074	0	0
3076	0	1
3248	1	0
3326	0	0
3439	0	0
3466	0	0

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
3487	0	0
3506	0	1
3587	0	0
3604	0	1
3704	0	0
3727	0	0
3746	1	0
3832	0	1
3911	0	0
3937	0	0
3983	0	0
4277	0	0
4299	0	1
4401	0	0
4497	0	1
4542	0	0
4700	0	1
4780	0	0
4926	0	0
5266	0	1
5293	0	0
5502	0	1
5529	0	0
5669	0	0
5714	0	0
5721	0	0
5947	0	0
6062	0	0
6170	0	0
6223	0	0
6233	1	0
6244	0	1

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
6308	0	0
6325	1	0
6619	0	0
6951	0	0
7060	0	1
7070	0	0
7096	0	0
7274	0	1
7309	0	1
7323	0	0
7337	0	0
7559	0	0
7682	0	0
7696	1	0
7750	0	0
7754	0	0
7872	0	1
7883	0	0
7918	0	1
7980	0	0
7984	0	0
7994	0	0
8091	0	0
8161	1	0
8189	1	0
8257	0	0
8265	0	0
8598	1	0
8729	0	1
8750	1	0
8757	0	0
8874	0	0

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
8898	1	0
8921	0	0
8936	0	0
8960	0	1
8997	1	0
9058	0	0
9132	0	1
9316	0	1
9329	0	0
9360	0	0
9453	0	0
9585	0	0
10080	0	0
10088	0	0
10280	0	1
10303	1	0
10318	0	0
10719	0	0
10809	0	1
10821	1	0
10996	0	0
11010	0	0
11019	0	0
11088	0	0
11205	0	0
11234	0	1
11511	0	0
11625	0	0
11692	0	0
11714	0	0
11753	0	0
11826	0	0

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
11849	0	0
11869	1	0
12042	0	0
12044	0	0
12069	0	0
12138	0	0
12153	0	0
12327	0	0
12375	0	0
12418	0	0
12495	0	0
12514	1	0
12609	0	0
12735	1	0
13113	0	1
13135	0	0
13159	0	1
13160	0	0
13331	0	0
13558	0	1
13579	0	0
13636	0	0
13722	1	0
13946	0	0
14200	0	0
14241	0	1
14271	0	0
14298	0	0
14505	0	1
14604	0	0
14711	1	0
14730	0	0

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
14772	1	0
14941	0	0
14965	0	0
15124	0	0
15139	0	0
15221	0	0
15326	0	1
15755	0	0
15760	0	1
15761	0	1
15820	0	0
15899	1	0
16078	0	0
16293	0	0
16369	0	0
16431	0	0
16474	1	0
16553	0	0
16563	1	0
16667	0	0
16672	0	0
16687	1	0
16690	0	0
16905	1	0
16996	0	0
17071	0	0
17217	0	0
17295	1	0
17433	1	0
17456	0	0
17464	0	0
17534	0	1

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
17629	0	0
17800	0	1
17809	0	0
17842	0	0
17997	0	1
18131	1	0
18247	0	0
18340	0	0
18521	1	0
18530	0	0
18532	0	0
18561	0	0
18667	0	0
18930	0	0
18987	0	1
19065	0	0
19140	0	0
19199	0	0
19310	0	0
19343	0	0
19415	0	0
19529	1	0
19640	1	0
19659	0	0
20018	1	0
20059	1	0
20064	0	1
20066	0	0
20086	0	0
20106	1	0
20399	0	0
20401	0	1

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
20415	0	1
20466	0	0
20560	0	0
20692	0	1
20771	0	0
20784	0	1
20891	0	0
21213	0	0
21282	1	0
21467	0	1
21750	0	0
21881	0	0
22228	1	0
22266	1	0
22297	0	0
22304	0	1
22405	0	0
22445	0	0
22492	0	0
22533	0	0
22623	0	0
22962	0	0
23047	0	0
23049	0	0
23105	0	0
23338	1	0
23361	0	0
23386	0	1
23436	0	0
23493	0	0
23641	0	1
23710	0	0

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
23853	0	0
24056	1	0
24085	0	0
24361	0	0
24525	0	0
24674	0	1
24742	0	0
24917	0	0
24931	0	0
24963	0	0
24978	0	0
25046	0	0
25234	0	0
25248	0	0
25471	0	0
25535	0	0
25628	0	1
25886	0	0
26121	0	1
26165	0	0
26355	0	0
26527	0	0
26634	0	0
26796	1	0
26947	0	0
27173	0	0
27188	0	0
27198	1	0
27199	0	1
27236	0	1
27327	0	1
27394	0	0

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
27537	0	0
27671	0	0
27690	0	0
27704	0	0
27866	0	0
27876	0	1
27996	0	1
28010	0	0
28176	0	0
28214	0	0
28219	0	0
28286	0	1
28354	0	0
28404	0	0
28460	0	0
28572	0	0
28649	0	0
28656	0	0
28658	0	0
28738	0	0
28761	0	0
28820	0	0
28854	0	0
28868	0	0
28919	0	0
29112	0	0
29165	0	1
29319	0	0
29325	0	1
29330	0	0
29407	0	0
29783	0	0

Deputy ID	Significantly Above the Mean	Significantly Below the Mean
29834	0	0
29849	0	0
30015	0	0
30050	0	0
30053	0	0
30147	1	0
32006	0	0
32008	0	0
32020	0	0
32022	1	0
32029	0	1
32037	0	0
32077	0	0
32082	0	0
32094	0	0
32118	0	0
32125	0	0
32139	0	0
32141	0	0