Iowa State University Police Department
2519 Osborn Drive
Ames, IA 50011

Ames Police Department
515 Clark Avenue
Ames, IA 50010

February 10, 2022

Dear Mayor Haila, City Councilors and President Wintersteen,

Our departments partnered with CR Research Group LC to analyze data on discretionary traffic stops. We requested the review as a proactive step to evaluate whether or not racial disparities existed in traffic stops and outcomes, including written warnings, citations and arrests.

The independent review found "negligible evidence of racial bias" by Ames and Iowa State University police officers when conducting traffic stops. The report that follows provides greater detail, but here are a few important findings:

- There is little evidence that officers stopped a greater proportion of people of color compared to white drivers. The disproportionality index (the measurement used to assess racial disparity) for both departments was almost always lower than .05, which is described in the reports as a low confidence indicator of disproportionality.
- In 2017-2018, the Iowa State review (which included three years of data) found people of color were more likely to receive a citation during a traffic stop, while white drivers were more likely to receive a warning. In 2019, there were no differences based on race.
- In 2018, the Ames review (which included two years of data) found no differences between people of color and white drivers. In 2019, white drivers were more likely to receive a citation and people of color were more likely to receive a warning as the result of a traffic stop.
- There was racial disparity in arrests for both departments, but nearly all of the arrests were for nondiscretionary offenses, which means officers were required to make an arrest.

Disproportionality is one way to assess potential bias or discrimination, but as the researcher explains in the report it may also indicate differences in driver behavior, vehicle condition or driver-license status. We also note that many of the findings for citations and warnings were not statistically significant, and the study did not control for other factors that may influence traffic stops and outcomes.

As stated above, nearly all of the arrests were for nondiscretionary offenses, which means the officer is required to make an arrest. This includes arrests for operating while intoxicated, driving while barred or existing warrants. Arrests also include "cite and release" charges, such as driving under suspension, which did not require the driver to go to jail, but promise to appear for a later court date. For these reasons, it is difficult to make definitive conclusions about all outcomes of traffic stops.

As with any study, there are limitations, but this is one tool that allows us to evaluate our performance over time. We will continue to examine traffic stops as part of our internal reviews. Our departments also provide ongoing bias-based training for officers, publish monthly reports on police activity and engage in conversations within our departments and the community about race.

We are committed to strengthening the relationships we have within our communities and improving transparency and appreciate your partnership in this effort.

Sincerely,

Chief Geoff Huff, Ames Police Department

Chief Michael Newton, Iowa State University Police Department

**Ames PD Police Traffic Study
2018-2019Report**

Prepared by: Chris Barnum
CR Research Group LC

February 1st, 2022
FINAL

Ames Police Traffic Study

The City of Ames partnered with CR Research Group LC to evaluate potential disproportionality in the Ames Police Department's discretionary traffic stop activity. The review focused on assessing stops made by the department between January 1st, 2018, and December 31st, 2019, and centered on evaluating two broad categories of discretionary police conduct: *(i)* racial disparity in vehicle stops—expressed as racial differences in the likelihood of being stopped by the police and *(ii)* dissimilarities across racial demographics in the outcome or disposition of a stop. This report provides distinct information for the years 2018 and 2019 and as will be explained in more detail below, its overall findings offer negligible evidence of racial disproportionality for outcomes measuring discretionary police behavior.

To evaluate the likelihood of being stopped, our research team utilized driver-population *benchmarks* fashioned from roadside observations and census data. A benchmark should be thought of as the racial proportion of drivers on the roads in a given location. At its best, a benchmark is a standard that can be used to judge the percentage of drivers that should be stopped by the police when no bias is occurring. In Ames, the population characteristics of the city were divided up into several observation zones (see figure one below).

Figure 1. Ames observation zones
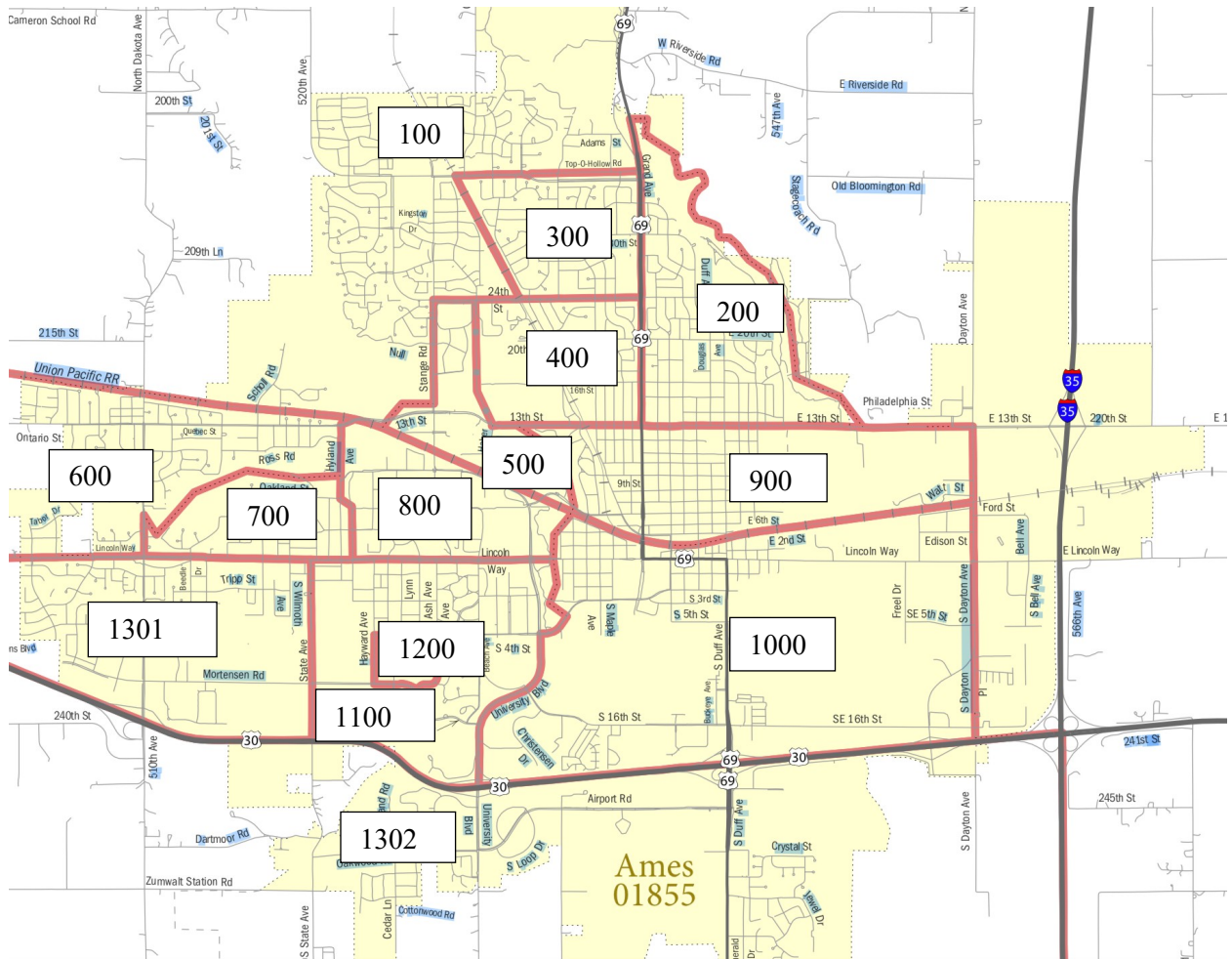
Once the boundaries of the observation zones were determined, roadside surveyors were deployed to monitor traffic at several locales within selected zones. The observers watched traffic at various times of the day ranging from 9:00 am until 2:00 am and logged more than 88,000 observations from locations across the city.

The process of comparing police data to benchmarks is straight forward. It centers on identifying differences between the demographic percentages from the police traffic stop data and benchmark information. Any positive difference between police data and benchmark information signifies ***disproportionality*** or an over representation of drivers who identify as people of color in the data. Although, disproportionality can indicate bias or discrimination, it does not necessarily signify bias. It is possible for disproportionality to occur for a number of reasons, including differences between racial groups in driving behavior, vehicle condition, driver-license status and so forth.

This methodology makes it possible to track disproportionality by area of town, by time of day, by duty assignment and by individual officer. While the method serves as a useful tool in assessing disproportionality, please keep in mind that the process produces only *estimates* of disproportionality. As noted, analyses are predicated on benchmark information and the benchmarks are formed from samples of the drivers on the roads in a given area and time. Consequently, like any sample, a benchmark may be associated with a degree of uncertainty or indeterminacy. This means that numerical estimates of disproportionality are likely associated with some error and the true population parameter may be larger or smaller than the estimate.[1] In what follows, we present a summary measure of disproportionality. This index can take on both positive and negative values, with zero signifying no disproportionality. However, given sampling error, smaller index values do not necessarily indicate disproportionality because such values could be due to chance alone. In general, the reader should interpret larger index values with greater confidence as an indicator of disproportionality than smaller values. As a rule of thumb, it is best to consider index values less than 0.05 as low confidence indicators of disproportionality, and index values greater than 0.10 as high confidence indicators.

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[1] Sources of variation and sampling error include variability of the traffic flow within observation zones, variability between roadside surveyors, variability of racial proportions of residents within observation zones, choice of locations to record traffic characteristics within a zone, and variability associated with assigning stops made on observation zone boarders. Observational benchmark information was gathered from locations that were predicated on police traffic stop activity rather than from a random sample of locations throughout each zone. Consequently, computations of exact margin of errors would likely result in margins that are too narrow.

Analyses for 2018 -2019

Department Level Analysis

Stop Locations

Figures 2 and 3 below give information related to the location and number of stops made by the Ames PD. In figure 2, each blue dot on the map represents an individual traffic stop and the darker areas on the map represent locations where multiple stops occurred in the same spot (here, the dots are stacked on top of each other). Figure 3 gives the number of traffic stops by observation zone. The information below shows stops made for 2019. The traffic-stop patterns for 2018 are very similar to 2019 and the corresponding figures are given in the appendix.

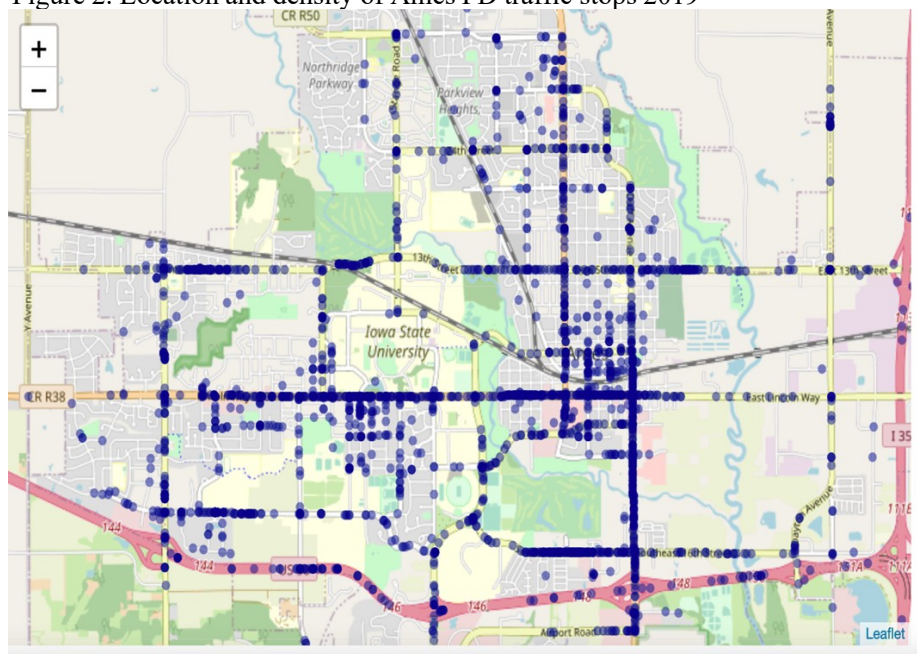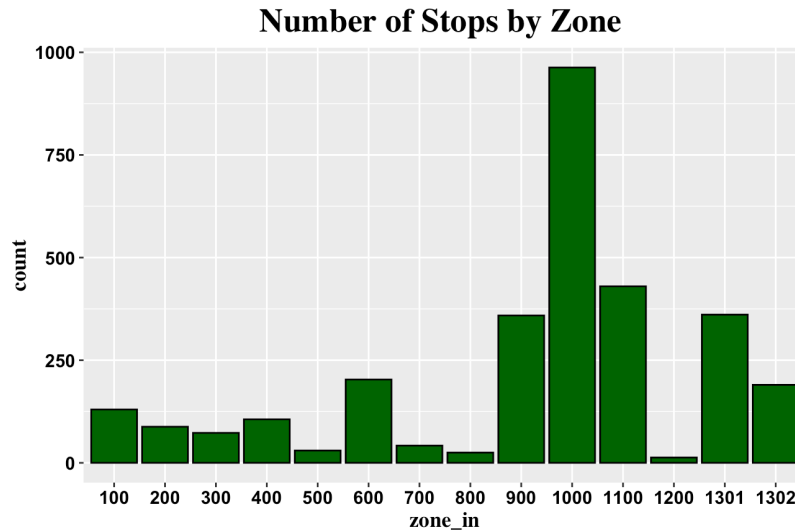Figure 2. Location and density of Ames PD traffic stops 2019

Figure 3. Number of stops per zone 2019

Number of Stops by Zone

Benchmark Comparisons

　　We utilized two benchmark standards for this study, called *Type I* and *Type II*. Applying multiple benchmarks is a useful statistical technique for inspecting and isolating the variation in disproportionality across demographic categories. Prior analyses conducted in other cities suggest that certain non-white racial categories may be stopped or sanctioned at lower rates than their actual percentages in the population of interest. When this is the case, classifying all people of color together as a single unit could mask disproportionality, but grouping a given non-white racial category with both nonwhite and whites and then comparing values between these classifications can help to isolate distinct levels of disproportionality. For this study, the Type I classification is comprised of all drivers who were identified as people of color on the roads, and the Type II grouping consists of these drivers, but excluding Asians. These classifications were chosen for statistical purposes only.

Disproportionality Index Values

　　Table 1 below gives information for the summary disparity index values by year for each type of classification broken out in three ways, for: *(i)* all officers, *(ii)* officers working days and *(iii)* officers working nights. The index gives an estimate of disproportionality using a weighted average. The index is computed by summing the weighted difference between percentage of police stops involving nonwhite drivers for a given observation zone and corresponding benchmark values. Weights consist of the number of stops made in each zone. As noted, readers should interpret higher index values with more confidence as an indicator of disproportionality than lower values and should consider index values less than 0.05 as dubious indicators of disproportionality.

Table 1. Disproportionality Index Values 201 - 2019

Benchmark Type	Assignment		
	Department	Days	Nights
2019			
Type I	0.01	-0.02	0.05
Type II	0.02	0.00	0.07
2018			
Type I	0.02	0.00	0.04
Type II	0.02	0.01	0.02

The information in table 1 generally shows negligible levels of disproportionality for both Type I and Type II groupings for the agency. As noted, index values less than 0.05 should be interpreted as low confidence indicators of disproportionality. Given this, the reader should have low confidence that the information in table 1 suggests statistically significant disproportionality for the APD as an agency.

Type I Grouping

The information in table 1 shows that the disparity index for the department was low and stable for both years of the study. For each year, the agency index values were less than 0.05, and given sampling error, the reader should have low confidence that this suggests statistically significant disproportionality greater than zero. Additionally, for each year, index values were lower for officers working during daytime hours than for officers working at night. The Type I index for officers working at night remained stable from 2018 to 2019.

Type II Grouping

The indexes for the Type II grouping were low and generally similar for all years of the study, and given sampling error, the reader should have low confidence that the results for Type II analyses suggest statistically significant disproportionality for the agency. As before, index values were lower for officers working during daytime hours than at night. However, the indexes for officers working at night increased from 2018 to 2019. In general, however index values were less than 0.05 for the most all years of analysis.[2]

The information in table 1 also indicates that disproportionality values for Type I and Type II indexes were generally similar for both years of the study. This suggests that disproportionality in traffic stops across non-white racial categories was largely comparable for all classifications for this report.

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[2] In 2018 the roughly 40% of APD stops were made during daytime hours. In 2019 about 60% of APD stops were made during daytime hours.

Comparison with Other Departments in Iowa

In recent years, our research team has used a similar methodology to analyze the police traffic stop data for several law enforcement agencies in Iowa. When compared to these departments, the index values for the Ames Police Department are generally lower or on par with corresponding values for these other departments.[3]

Officer Level Analysis.

We calculated a disparity index for each officer making more than twenty-five stops during each year of the study. The index consists of two ratios and is computed by comparing the fraction of stops involving nonwhite drivers to corresponding benchmarks divided by the proportion of stops involving white drivers to their corresponding benchmarks. These values are weighted by the number of stops and summed across all zones.[4] Higher absolute values suggest more disproportionality.

The charts below give the disparity index values and number of stops for officers making at least twenty-five traffic stops in each year of the study. For each chart, the index values are given along the horizontal axis and the number of stops on the vertical axis. The blue horizontal line indicates 100 stops made (90 stops for the 2018 charts), the thick red dashed line shows the median disparity index value for all officers making at least twenty-five stops and the thin red dashed line gives the index 90[th]percentile value for all officers making twenty-five stops.

These charts are mainly useful qualitatively as an internal benchmarking instrument for comparing officers to one another.[5] The charts facilitate identifying officers with comparatively high and dissimilar index values. Such officers would show up as a solitary dot, located above the blue dashed line and on the extreme right side of a chart. It is important to use caution when interpreting index values calculated from a relatively low number of stops (especially, fewer than one-hundred stops). Index calculations predicated on comparatively few stops can be quite unstable and change significantly with the addition or subtraction of only a couple of stops. The stability of the index increases as the number of stops increase. Additionally, we suggest police managers should use additional internal benchmarking techniques to supplement interpretations of index results, especially for any officers identified with high index values. For instance, managers should compare these officers to similarly situated officers, including those who work the same shifts, beats, duty assignments, special projects and so forth in order to gain additional insight into index interpretations. Finally, it is important to recognize that an individual index value reflects a single snapshot in time. And given the indeterminacy associated with computing the index, it is important to interpret outcomes by looking for trends through time.
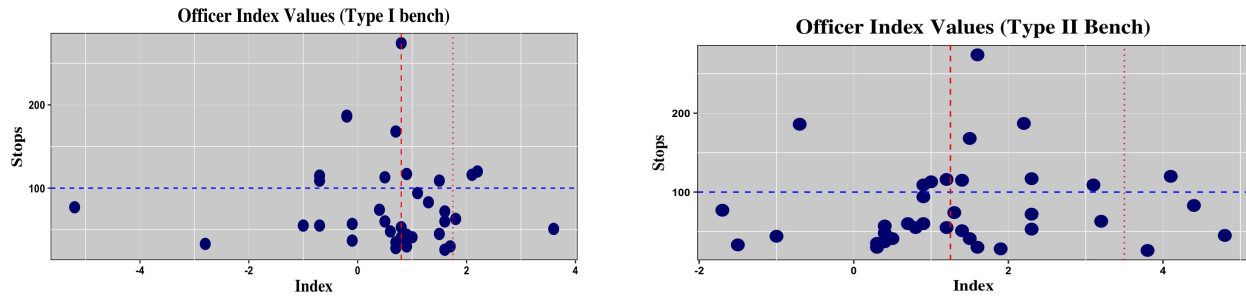
The information below suggests that officers' index values are generally clustered together with no outliers. Although there is an officer in the 2018 analyses with comparatively higher index values than others, this officer made only about 90 stops so the results should be interpreted with caution.

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[3] For instance, the average index for three communities in Iowa with comparable (or slightly larger) population sizes to Ames, equaled roughly 0.07 (using a Type II grouping), 0.08 (Type I grouping) and 0.02 (Type II grouping).
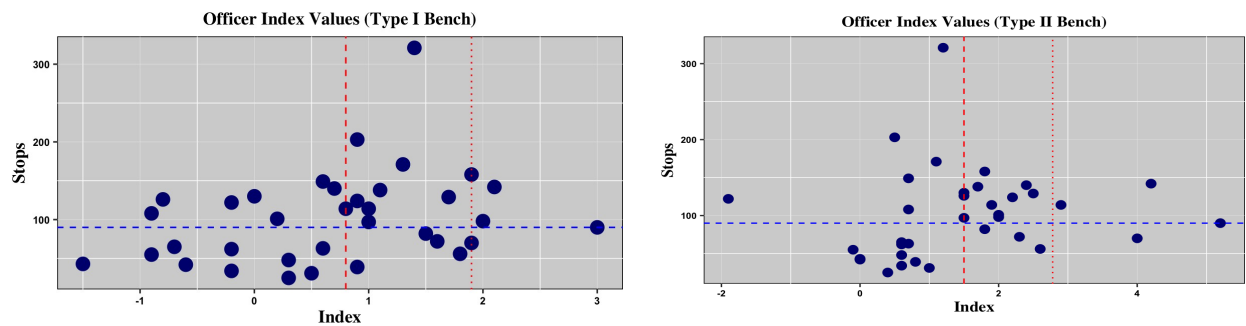
[4] Initial index values can range solely between zero and positive infinity. However, in computing reported index scores, the values between zero and one in each zone are converted to their negative reciprocal and all scores are then weighted and summed. Please note there are at least two sources of indeterminacy in computing index values. The first is the previously mentioned potential sampling error associated with benchmark estimates. The second source of indeterminacy is that the index is undefined when the denominator equals zero. This generally occurs when very few stops are made in a zone. In these circumstances the index is made to generate a unit value.

[5] Walker, 2003. https://samuelwalker.net/wp-content/uploads/2010/06/InternalBenchmarking.pdf

Charts for 2019

Officer Index Values (Type I bench)

Officer Index Values (Type II Bench)

Charts for 2018

Officer Index Values (Type I Bench)

Officer Index Values (Type II Bench)

Stop Outcome Results

We used an examination of stop outcomes to assess disproportionality in citations, warnings and arrests. As the name implies, a stop outcome gives information about the consequence of a stop. An example of an outcome is whether a driver received a ticket as a result of the stop. In what follows we measure disproportionality using a statistic called an *odds ratio*. This estimator is a measure of effect size and association. It is useful when comparing two distinct groups and summarizes the odds of something happening to one group to the odds of it happening to another group. An odds ratio value greater than one indicates an increased occurrence of an outcome for a nonwhite driver. Analyses of odds ratios are an excellent way to identify trends in the data. Tables 2 and 3 below give the odds ratios for stop outcomes for 2018 and 2019. For clarity of presentation, we first present information for Type I classifications here and then the table for Type II groupings immediately below.[6]

In what follows, it is important to note that nearly all the arrests made in all years of the analysis—for both types of benchmarks—were for *nondiscretionary* charges. These are offenses that owing to state law or departmental policy, leave officers with very little or no choice in deciding whether to make an arrest. Officers are in essence required to arrest, and

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[6] We used a 'seriousness of offense' methodology to classify outcomes. For instance, if a person was arrested and cited on a single stop (for separate offenses), we classified this as an arrest but not as a citation. Likewise, a person who received both a ticket and a warning on a stop was classified as being cited but not warned.

would in fact, be subject to departmental discipline if they chose not to arrest.[7]

Table 2. Type I Outcomes

2019	Odds Ratio	Probability <
Citations	0.75 (1.33)	0.08*
Warnings	1.17 (1.26)	NS
Arrests	1.46	0.05

2018	Odds Ratio	Probability <
Citations	0.95	NS
Warnings	0.95	NS
Arrests	1.25	NS

* NS indicates not statistically significant.

The information in table 2 suggests that when compared to 2018, nonwhite-driver disproportionality in citations decreased in 2019, but disproportionality in arrests increased (disproportionality in warnings was nonsignificant for both years). In 2019, white drivers were about 33% more likely to receive a citation in comparison to other drivers. In 2018 this outcome was statistically insignificant, signifying no difference between racial classifications.

The results for arrests were reversed. In 2018, when compared to white drivers, the likelihood that people of color were arrested was not statistically different than other drivers, but in 2019, in comparison to white drivers, a person of color driver was about 45% more likely to be arrested during a traffic stop. It is unclear what the reasons are for this change. As noted, the vast majority of arrests were for nondiscretionary charges.

The results in table 3 using Type II information are substantively similar. When compared to 2018, nonwhite-driver disproportionality in citations decreased in 2019 (as before, disproportionality in warnings was nonsignificant for both years). And as before, disproportionality in arrests increased, with the arrest odds ratio for 2019 notably higher.

Table 3 Type II outcomes.

2019	Odds Ratio	Probability <
Citations	0.635 (1.57)	0.01
Warnings	1.12	NS*
Arrests	2.33	0.001

2018	Odds Ratio	Probability <
Citations	0.77 (1.29)	0.05
Warnings	0.95 (1.05)	NS
Arrests	1.85	0.001

* NS indicates not statistically significant.

Taken together, the findings in tables 2 and 3 suggest greater disproportionality in arrests involving African American drivers than in other people of color. Given that Type I

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[7] The APD conducted supplementary analyses on the 2019 arrest data and found that nearly all traffic-stop arrests involving African American drivers were for nondiscretionary of mandatory arrest types of charges.

classifications compare whites to all people of color and Type II categories compare whites plus Asians to all others, an increase in an odds ratio when Asians are no longer grouped with African Americans is an indicator of increased disproportionality for African Americans.

It is important to reiterate here, that additional analyses performed the APD suggest that nearly all the arrests made were for nondiscretionary charges. In these circumstances, officers have very little discretion in deciding whether to make an arrest. These types of charges include offenses like bench warrants, driving while barred and operating while intoxicated. *APD analyses show that in nearly all instances where an arrest was made, officers had little choice in the matter.*

Conclusions

This study examined the traffic stop behavior of the Ames Police Department using data from 2018 and 2019. The investigation focused on two broad categories of police conduct, racial disproportionality in vehicle stops (at both the agency level and officer level) and disproportionality in the outcome or disposition of a stop. Findings from the examination of disproportionality in vehicle stops show that at the department level, index values were always less than 0.05 for both years of the study. Given sampling error, these results provide negligible evidence of statistically significant disproportionality in stops for the agency.

Analyses of officer level data indicated that officers' index values were generally clustered together with similar index values for both years of the study suggesting no officers had notably higher levels of disproportionality than colleagues. Finally, the results for the analyses of stop outcomes does not suggest disproportionality in stop outcomes for citations or warnings but does indicate some disproportionality in arrests. Levels of disproportionality were higher in 2019 than in 2018. Even so, it is important to note that supplemental analyses by the APD suggest that almost all arrests were made for nondiscretionary offenses, meaning officers were required to make an arrest and had little or no choice in the matter.

Limitations of the Study

It is important to note several limitations of this study. First, the data for this study came from sources that were not initially or primarily intended for the examination of disproportionality in traffic stop decisions or outcomes. These sources consisted of data from the Ames Police Department's record management systems "OSSI" and "TraCS." These systems are principally intended for managing information from calls for service and traffic accidents rather than discretionary traffic stop information. Consequently, some important information was not available including: *(i)* information about stops resulting solely in verbal warnings, *(ii)* information about requests for voluntary searches of vehicles or occupants, *(iii)* information about the drivers age, *(iv)* information about occupants of the vehicle, *(v)* information about 'Terry Frisks" or pat-downs of the driver or occupants, *(vi)* information regarding whether occupants were asked to step out of the vehicle, *(vii)* information about whether arrests were made for discretionary or nondiscretionary charges *(viii)* information about officer characteristics. Second, the classifications for the reason for the stop were in some cases ambiguous. This made it impossible to assess if a stop occurred because of a moving or equipment violation. Third, some nondiscretionary stop information resulting from traffic accidents may have been included in the data. These shortcomings limited the types of analyses that could be conducted. Some analyses such as logistic regression and other comparable techniques were not appropriate because several suitable and necessary control variables were not available.
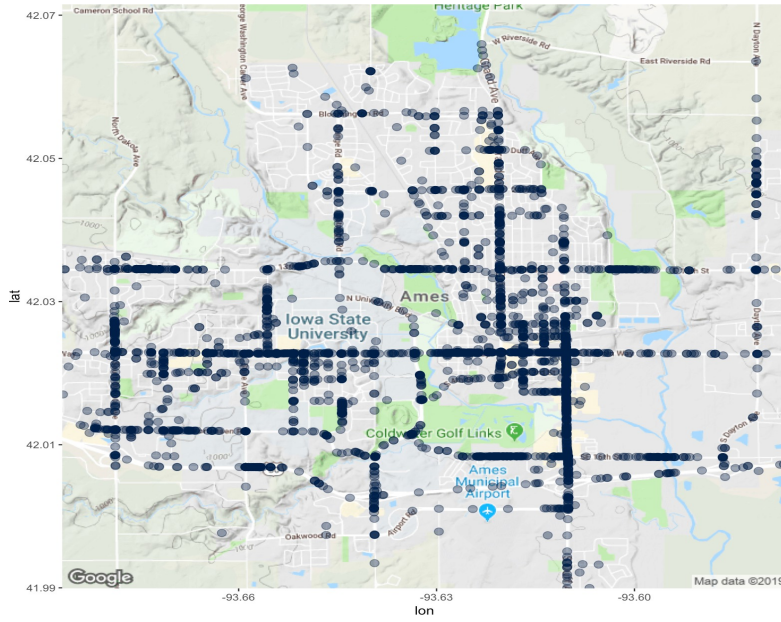
Recommendations

We recommend the following. First, if possible, the Ames Police Department should develop a dedicated 'racial disparity' traffic stops data collection system that would generate a dataset that is more amenable to analyses that are capable of identifying and evaluating disproportionality in stops and outcomes. This, however, is dependent on the State of Iowa including driver's race information on Iowa driver's licenses. Currently, the state is phasing out this information on state DLs and consequently, accurate assessment of race based off license information may not be possible in the future.

However, if the state reverses course, in addition to data that is already available, this new collecting system should include the following pieces of information: *(i)* the reason for the stop (at a minimum the classification of stops as moving or nonmoving violations), *(ii)* complete demographic information about driver and occupants of the vehicle, *(iii)* information about voluntary search requests, *(iv)* information about vehicle and occupant searches (and the reason for the searches), *(v)* documentation of items seized in searches, *(vi)* a record of whether pat-downs were conducted, *(vii)* documentation of field interviews, *(viii)* a log of requests for driver or occupants to exit the vehicle, *(ix)* a record of warrant and registration requests (for both vehicle and occupants) and *(x)* complete officer demographics, including age, gender, race, years of service and duty assignment. Second, police managers should use the information from disproportionality analyses to look closely at disproportionality found at the officer level. Supervisors should use 'internal benchmarking' techniques to compare an officer to similarly situated officers (e. g., other officers working the same time, duty assignment, beat and so forth) to determine if these structural factors may account for some or all observed disproportionality. Third, if possible, the Ames Police Department should continue assessing disproportionality yearly at both the individual and aggregate level. These analyses could be conducted internally and in-house. This assessment should focus on looking for trends in the data.

Appendix

2018

2018

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