

Vehicle Stop Data Collection, Analysis and Application by Columbia Police Department
Draft Recommendations, May 5, 2022

Summary

Traffic stop data collected for Missouri's Vehicle Stops Report (VSR) document that Black drivers in Columbia are stopped disproportionately. Disproportions do not prove discrimination, but they do flag situations in which officers might not be acting on facts that are clearly independent of racial stereotypes.

If Columbia Police Department collects the right information to tell what facts officers are basing their decisions on, supervisors will be able to guide officers to ignore stereotypes and focus on facts that truly identify criminal behavior.

More detailed analysis of traffic stop data than offered in the VSR will help by focusing attention on situations in which the largest disproportions occur. The disproportions will lead supervisors to situations in which guidance will be most effective in producing bias-free policing.

The Vehicle Stops Committee recommends these steps:

1. **Data Collection:** If CPD is to overcome our heritage of distrust, as much information as practically possible on the variable factors officers consider when deciding to take an action must be available in a simple form—computer data derived mostly from checkoffs officers can do quickly and efficiently.
2. **Data Analysis:** The information is then analyzed with descriptive statistics: counts, unit rates and disproportions between group rates for all categories of data collected in order to flag the possibility of discrimination.
3. **Post-Stop Rates and Disproportions:** Post-stop actions, such as writing citations and asking for consent to a search, are evaluated on the basis of actions per stop or contraband found per search, avoiding the need to estimate group proportions. Post-stop rates separate what officers do on their own after making a stop from other variables that are out of their control, such as where they are ordered to patrol and respond to alerts.
4. **Incident-Based Data:** The aggregate data in the VSR limit analysis to individual categories, but Incident-based data allow different categories of data to be examined together. For instance, the VSR's aggregate data allows stops for Black drivers to be analyzed but IBD allows analysis of stops for young Black males at night in different beats.
5. **Alternative Disproportions and Methods of Analysis:** Disparity indexes and distributions within categories can also be used for special purposes. Multivariate analysis, such as the ones performed by University of Missouri professors, can make sure the right situations are being monitored and that progress is being made toward law enforcement that is free from discrimination.
6. **Monthly Public Access to Data:** Data updates are posted on the city website with graphics and interactive features to aid public understanding and document progress.
7. **Annual Review:** CPD summarizes its work for residents and city officials: what has been documented about the situations in which groups are disproportionately affected, the facts officers act on and what measures have been taken to address incidents in which officers have

not acted on facts clearly independent of racial stereotypes? What improvements in policies, training and supervision have been made to address problems flagged?

8. **Officer Feedback by Supervisors:** In monthly sessions focused on agency-wide situations that have been flagged as involving possible discrimination, officers who have cited convincing reasons for their actions that are clearly independent of racial stereotypes are commended. Officers who are not citing convincing facts are counseled to be sure to act on facts and record them accurately. Monthly feedback sessions become part of annual performance reviews.
9. **Self-Reviews by Officers:** Officers evaluate their own performance based on monthly incident-based data for actions flagged for possible discrimination.
10. **Criteria for Credible Intelligence:** An essential part of the process is CPD establishing criteria for what facts are sufficient to document that actions are independent of protected categories.
11. **Command Staff Performance:** Command staff are responsible for making sure policies, training and supervision reinforce bias-free policing and do not contribute to systemic sources of disproportions.
12. **Survey Data:** Surveys are taken periodically in order to complement traffic stop data analysis with qualitative evaluations of the experiences of residents and officers.
13. **Conclusion.**

Introduction

Twenty years of Vehicle Stops Report (VSR) data for Columbia Police Department (CPD) document that Black drivers are stopped at a rate per driver-age resident more than four times the rate for White drivers. The disproportion in 2021 was 4.01.

[590.650](#), the 2000 law that mandates the VSR, was motivated by anecdotal evidence from Black drivers that they are treated differently in traffic stops—that officers see Driving While Black as a crime they must enforce. Laws targeting Blacks have been a real part of our history. Many were still on the books until the Civil Rights era. Although most laws are now free from explicit racism, implementation of the principle of equal protection has not been completed. Even now Black parents warn their children that officers cannot be trusted.

A high disproportion does not prove officers are discriminating against Black drivers, but it is circumstantial evidence that must be taken seriously. Discrimination can only be proven by documenting that officers applied different evidentiary standards to protected categories.

An outside investigator, such as the US Attorney General acting under the [Law Enforcement Misconduct Statute](#), could determine whether officers are acting on evidence that is clearly independent of race, but it would be better for CPD to investigate itself.

As CPD develops the capacity to collect, analyze and apply the right data so that it can document that disproportions have been eliminated or that they are caused by factors other than discrimination, individuals vulnerable to discrimination begin to trust and cooperate with officers.

Police Chief Geoff Jones asked volunteers to join his Vehicle Stops Committee (VSC) to advise him on how to use data to tell when officers might be treating groups unfairly. As an example, he recalled that as a rookie he had been told that if he observed two vehicles with similar minor equipment violations,

he should stop the older one. This tactic, the Chief pointed out, could lead to discrimination based on socioeconomic status and also on race.

The VSC **recommended checkoffs**¹ be added to the list required for the Vehicle Stops Report, such as a checkoff for specifics about minor violations. CPD is now collecting data based on that list.

Chief Jones also told the committee he wanted to use the data to improve officer performance. As with many other chiefs, he has found disproportions do not provide the facts he needs to tell whether officers need guidance. Recommendations offered here cover data collection, data analysis and how the information can be used to improve policies, training and supervision.

1. The Requirements of 590.650 and the Process of the Bias-Free Policing Policy

590.650, the law that mandates the VSR, has several weaknesses that have reduced its ability to address discrimination. Not enough information is collected. Analysis of data does not give law enforcement agencies the information they need to improve policies, training and supervision. Bias as “racial profiling” is seen to be the principal problem, but bias is difficult to detect and even more difficult to prove.

After more than 20 years, the data haven’t told us much besides the problem is real; Blacks are disproportionately stopped. Is the cause officer antipathy towards Blacks? Is it the tactics officers use to fight violent crime, such as drug dealing? Is it the tactics officers use to address problems in specific areas, as Jay Nixon, then AG, thought in 2001: officers assigned to hot-spot patrols?

The legislature in 2000 focused on pretext stops, in which officers use a minor violation as the legal justification for making a stop they would normally ignore, but the original law didn’t allow data to be collected on investigative stops, and when investigative stops were added to the law in 2002 no definition of them was given. They weren’t explained to law enforcement agencies until Attorney General Schmitt broke them down in the Code of State Regulations into stops related to 911 calls for service, stops based on agency bulletins and stops based on the officer’s investigative desire. But if investigative stops are the cause of stop disproportions, officers weren’t accurately recording them in 2020.

High discretion searches suggest the cause of disproportions is not bias-based antipathy but policies that lead officers to depend on suspicions instead of the facts their actions should be based on. In 2013 statewide data, Black drivers were subjected to consent searches at a rate per stop 1.45 times the rate for White drivers. The VSR provides numbers on consent searches but does not figure rates and disproportions. Civil Rights activists began agitating for consent search disproportions to be addressed by publicizing the disproportion. Law enforcement agencies took little visible notice, but the disproportion began to decline. In 2019 and 2020, White drivers were slightly more likely to searched on consent.²

These results could come from other factors, but officers appear to have gotten the message that they were overusing consent searches in ways that unfairly affected Black drivers. Drug-dog alert searches have a similar pattern but the cause of the decline in the disproportion against Black drivers is easier to

¹ Provide link to document on the [VSC’s webpage](#).

² Consent searches are one of the clearest examples of how data can be useful. For a fuller discussion see [An Introduction to Columbia Police Department Traffic Stop Data](#) by Don Love on the [VSC’s webpage](#).

pin down. In the 2015 Supreme Court [Rodriguez v. United States](#) decision justices ruled that a traffic stop could not be extended in order to conduct a drug-dog search unless the officer knew facts that justified the search.

In 2009 statewide data, Black drivers were subjected to drug-dog alert searches at a rate per stop 1.57 times the White rate but by 2017 the disproportion disappeared. When officers were told they had to cite facts to justify calling for a dog to alert, they became more careful about checking their facts. Race-based suspicions are a likely factor, but when officers knew judges would accept the results of the searches only if they cited “reasonable suspicions,” defined as “specific and articulable facts,” the disproportion declined.

A CPD supervisor now reviews officer requests for drug-dog searches based on criteria that implement the Rodriguez ruling.

Low-discretion actions require officers to act on definite facts, which protects them from the distraction of racial stereotypes. Strict standards are set for DWI arrests. Facts officers knew must be documented in incident reports. White drivers almost always have high DWI arrest disproportions in CPD IBD. In 2020 White drivers were arrested for DWIs at a rate per stop 1.16 times the Black rate.

So, from the disproportions, Black drivers do not seem to be targeted for DWI arrests, but a bias that favors White drivers could still be involved in the decisions to check for intoxication. No data has been available for officers deciding to conduct a DWI field test. And officers might be ignoring evidence of intoxication when White drivers are involved.

Data for consent searches and other high discretion situations support the hypothesis that VSR disproportions are not driven by intentional discrimination but by race-based suspicions that can be controlled by officers when they are careful to look for facts.

590.650 and the VSR which it mandates are a good start toward helping agencies address discrimination and continue to answer the basic question they were designed to answer: are Black drivers disproportionately affected by officer actions? Yes, they are. In order to know why they are affected and what to do about it, jurisdictions need to go beyond the VSR by collecting and analyzing more information.

Another drawback to the legacy of 590.650 is that it requires agencies to perform officer evaluations that are misdirected.

590.650 requires agencies to evaluate officers on the basis of stopping too many Black drivers, but the underlying problem is different evidentiary standards being applied to one group, which is discrimination. For instance, either Black drivers are stopped for minor violations which are usually ignored, or White drivers are not stopped for similar violations. Here’s what the law has to say:

5. Each law enforcement agency shall adopt a policy on race-based traffic stops that:
 - (1) Prohibits the practice of routinely stopping members of minority groups for violations of vehicle laws as a pretext for investigating other violations of criminal law;
 - (2) Provides for periodic reviews by the law enforcement agency of the annual report of the attorney general required by subsection 4 of this section that:

(a) Determine whether any peace officers of the law enforcement agency have a pattern of stopping members of minority groups for violations of vehicle laws in a number disproportionate to the population of minority groups residing or traveling within the jurisdiction of the law enforcement agency; and

(b) If the review reveals a pattern, require an investigation to determine whether any peace officers of the law enforcement agency routinely stop members of minority groups for violations of vehicle laws as a pretext for investigating other violations of criminal law....

(3) Provides for appropriate counseling and training of any peace officer found to have engaged in race-based traffic stops within ninety days of the review.

The law does not define its terms, which detracts from clarity. What does it mean by racial profiling, race-based, pretext, pattern, routinely and so on.

“Racial profiling” appears to be used as the title of 590.650. Blacks often define racial profiling as race being used to spot criminal activity; race triggers the officer’s decision to make a stop. But many agencies have had racial profiling policies, based on commonly accepted standards in law enforcement, that say it only occurs if race is the sole reason for a stop.³ If racial profiling is alleged, the agency checks to make sure the officer has cited at least a minor violation; if so, racial profiling has not occurred and the allegation is denied.

“Race-based” presumably means an officer’s facts differ depending on race.

A “pretext” stop is usually defined as an officer using a minor violation as an opportunity to look for more serious violations. Officers are given the discretion to stop drivers with no known violation. They might want to check on the well-being of the driver. But evidence discovered in a stop cannot be used in court if the stop was not based on probable cause. So officers wait to make a stop until they have observed at least a minor violation. The 1996 Whren⁴ decision by the Supreme Court said even the most minor violation was enough.

“Pattern” is a synonym for “disproportion” in this context. The mathematical disproportion establishes that an underlying tendency exists when enough incidents are involved to minimize the effect of chance. A high disproportion based on a handful of incidents does not document a strong pattern.

“Routinely” seems to be saying officers may discriminate once in a while as long as they don’t do so all the time, but, to be fair, legislators probably meant “routinely” to explain the meaning of “pattern.” The data is meant to catch situations in which the problem is seen to be a common occurrence, not isolated incidents of discrimination.

Stops disproportionate to the number of members of a minority group draws on the definition of a disparity index, the VSR measure of disproportion. No indication is given in the law of how high a disparity index needs to be to trigger an investigation.

³ Fridell, Lorie. (2017) *Producing Bias-Free Policing: A Science-Based Approach*. Switzerland: Springer International Publishing. Page 33

⁴ See [MICHAEL A. WHREN and JAMES L. BROWN, PETITIONERS v. UNITED STATES](#)

Agencies have been likely to see in the VSR they have a Black disparity index for stops undeniably high enough to raise concerns, but they use their definition of racial profiling to conclude that all stops were free from discrimination because they were not based solely on race.

CPD's [Bias-Free Policing Policy](#), on the other hand, sets up a strategy for using traffic stop data as a way to build community trust by changing the focus from bias to acting on credible intelligence. The policy is based on a model by Dr. Lori Fridell who wrote the book on traffic stop analysis, [By the Numbers](#), for the Police Executive Research Forum (PERF) and a more recent study of how jurisdictions can address possible discrimination in traffic stops, *Producing Bias-Free Policing*.⁵

Dr. Fridell's basic points, as they appear in CPD's policy, are:

1. "All affected employees will receive initial training during the orientation phase on fair and impartial/bias-free policing and racial profiling as well as annual training in bias issues including legal aspects. The training should address the psychology of bias and how bias can affect police activities and decision making during various contacts with individuals in our community. (404.4).
2. "Agency personnel may not consider the specified characteristics except when credible, timely intelligence relevant to the locality links a person or people of a specified characteristic to a specific unlawful incident, or to specific unlawful incidents, criminal patterns or schemes" (402.5).⁶
3. "Officers detaining any person shall be prepared to articulate sufficient reasonable suspicion to justify the detention independent of the specified characteristics of the individual" (402.6.1).
4. "To the extent that written documentation would otherwise be completed (e.g., arrest report, Field Interview), the involved officer should include those facts giving rise to the officer's reasonable suspicion or probable cause for the detention as applicable" (402.6.1).
5. All "duties" (402.2) fall under this policy, everything officers do when they have someone under detention—not just searches and arrests, for instance, but also the decision to ask for consent to a search and begin an investigation by making a pretext stop.

Details of training are not spelled out in the policy, but a central point in Fridell's book, drawing on work by Dr. Jennifer Eberhardt, is that implicit biases can be controlled by taking a moment before acting to make sure known facts are clearly independent of racial stereotypes. Dr. Eberhardt summarizes her approach in the ten-minute TED Talk: [How racial bias works — and how to disrupt it](#).

Notice the "racial profiling" is part of the training. The term is not used in Fridell's model policy. She criticizes racial profiling policies; race should not be a factor in officer actions at all, she says. Saying it cannot be the sole factor sounds right but gives agencies a way to distract concerns about discrimination. If a complaint is made, the agency just checks to make sure the officer observed a minor violation.

CPD had a Racial Profiling Policy that used language equivalent to the "solely" policies. CPD routinely rejected allegations of discriminatory stops on the basis that officers always cited at least a minor

⁵ Fridell, Lorie. (2017) *Producing Bias-Free Policing: A Science-Based Approach*. Switzerland: Springer International Publishing.

⁶ That is, officers must first make sure their facts are sufficient to support their actions before taking race into consideration. For instance, physical characteristics may be considered only after a reliable description of a suspect in a specific crime is available.

violation. At an NAACP community meeting, Chief Ken Burton said the community needs to learn what racial profiling means from CPD. Moderator Pam Harden replied that Blacks know what racial profiling is and CPD officers are doing it.⁷

Chief Burton decided CPD needed a new definition. CPD replaced its old policy with the Bias-Based Policing Policy in 2018. The organization that CPD uses to make sure policies comply with state requirements reinserted the “solely” wording, in the apparent belief that 590.650 required it. That’s how engrained “solely” policies were in law enforcement. But Dr. Fridell explained the damage it would cause and CPD removed it.

Data collection and analysis is not specifically mentioned in Dr. Fridell’s model policy because many agencies do not have the resources to manage data effectively, but her book discusses what agencies can do with data, starting on page 65. The details on data collection and analysis do not belong in a policy on discrimination. CPD needs a separate policy that sets a standard for data application.

The facts that help officers avoid being distracted by racial stereotypes are recorded in reports (402.6.1), which for CPD include the checkoffs they do after traffic stops, so that supervisors can easily screen for situations in which officers are not being careful enough about their facts. Data analysis, resulting in disproportions for each type of incident, can then help supervisors see what situations need close attention.

The process set up in the Bias-Free Policing Policy is that officers will be held accountable for the facts they act on. Having a bias is not something an officer gets dinged for; biases are normal, according to the “science of bias” cited by Fridell, but must be under control. Stopping too many Black drivers is not a problem as long as adequate facts are cited. Instead of explaining this process, the policy falls back on the process required by 590.650.

590.650 requires that agencies evaluate performance based on group proportions of stops, so that’s what the Bias-Free Policing Policy has to say (402.8). CPD must fulfill this requirement, but the conclusions have probably always been that no officer was “found to have engaged in race-based traffic stops” (402.8) because race-based traffic stops have not been defined and proof is not in the data.

If the review looked for credible intelligence clearly independent of racial stereotypes, many officers would have received valuable feedback, and been grateful for it.

So, complying with the BFPP, CPD starts with data collected for the VSR and subjected to an initial analysis by the Attorney General. Then CPD collects additional data that captures the facts officers report acting on, computes disproportions for all categories of data collected, and reviews incidents flagged by the largest disproportions. Officers receive helpful feedback on the facts they cite. They learn to be more careful about acting on convincing facts. Vulnerable individuals notice disproportions are declining and officers are stopping them only for violations that threaten public safety. Gradually trust develops. Officers begin to receive the help they need to control criminal activity.

⁷ Footnote Daily Tribune article?

2. Data Collection

In so far as data can capture the facts officers act on, data analysis allows an initial assessment of possible discrimination which can be performed quickly and routinely. Disproportions in data collected on traffic stops flag situations in which officers might be applying different evidentiary standards to racial and ethnic groups. For a full assessment of discrimination, more information must be known than is possible to capture in data. The details in reports, video recordings, interviews and so on supply necessary information.

CPD and other law enforcement agencies already collect much of the data necessary for a variety of purposes. They are required to do this by the law that mandates the Vehicle Stops Report ([590.650](#)) and they need the data for internal decision-making purposes. Rates and disproportions are easy to determine by running the data through simple descriptive statistics. A high disproportion tells command staff which situations they need to investigate in greater depth for discrimination.

Individual discriminatory actions might not show up in high disproportions, so they need to be detected in other ways. Complaints are likely to trigger investigations. The disproportions are more likely to flag systemic issues related to what officers are told to do. For instance, if officers are found to ignore equipment violations in newer cars and make stops for the same violations in older cars, then training needs to change.

With a low disproportion, or no disproportion or a declining disproportion, command staff can tell they are doing the right things to prevent a pattern of discrimination, although individual incidents of suspected discrimination will still need investigation.

In order to have basic facts, CPD must collect as much information about traffic stops as practical through officer checkoffs, starting with the variables required for the VSR. The checkoffs need to document in yes-and-no form the specific and articulable facts that led officers to take the actions they did. For instance, CPD policy requires officers to stop a car identified in a call for service (911 call) if possible. For a quick review, the details of the 911 call are not needed, just the checkoff indicating one was involved in the stop.

The checkoffs also need to document situations in which a group is concerned that its members are subjected to evidentiary standards different than those applied to other drivers. If complaints or anecdotal evidence suggest Black drivers are stopped for violations that do not lead to stops of other drivers, then checkoffs are needed for these minor violations, such as driving at less than 5 mph over the limit. **The objective is for CPD to confirm or deny anecdotal evidence from Black drivers that they are being stopped disproportionately and also to document the facts officers are acting on.**

See the most recent checkoff recommendation from the Vehicle Stops Committee (VSC): [Committee Recommendations: Data "Check-Offs," March 9, 2021](#)

The process depends on officers being thoroughly trained on the importance of accurate documentation of stops and held accountable for accurate, timely reporting. The CPD [Bias-Free Policing Policy](#) already requires that they act on "specific and articulable facts" or "credible intelligence," and that they record these facts. The record can be arrest reports, field notes, body-cam recordings and so on in which officers follow procedures to protect confidential information. Data checkoffs are the most efficient method to gather the information needed to make sure officers are

acting on facts. If the facts can be identified in the data, then a closer investigation of detailed reports will usually not be necessary.

Spot checking the accuracy of checkoffs will be necessary to protect integrity. Prompt completion of checkoffs is necessary so that staff can process reports needed to give officers prompt feedback.

Information that can be accurately retrieved through linked databases might not need checkoffs. For instance, if officers enter information in other reports about consent for a search being given or refused, traffic stop checkoffs might not be necessary.

VSR checkoffs capture the location of the violation as city street, interstate highway, and so on, but more details are needed to determine, for instance, the beat in which a violation was observed. Locations might best be captured by computer identification of the coordinates of where an officer observed the violation that led to the stop.

With information now available on stops broken down by officer beat assignments, more details on driver residence become important. The VSR requires officers to record whether a driver resides in the jurisdiction but identifying a beat will probably require a current street address, which can't be done in a simple checkoff. Perhaps a linked database could be used. Data collection is always dependent on the limits of technology and efficient use of an officer's time.

Recommendations on checkoffs will require periodic updates as CPD has more experience using data and conditions change. For instance, detailed checkoffs for minor violations might not be needed if disproportions no longer exist.

3. Data Analysis: Unit Rates and Disproportions

Data analysis starts with the simple descriptive statistic of **the number of stops** in each category of data collected, broken down by group.

The number of stops is useful in its own right; it measures officer activity. A large disproportion for a situation with a large number of stops helps establish priorities. A small number stops can signal that a disproportion is not statistically significant. Stops and types of stops can be plotted on a map using GIS software to see how areas of the city are affected.

Total stops for each group are not enough. Because there are many more White residents in Columbia than other groups of residents, one would expect many more of them to be stopped. There were 2732 stops of Black drivers in 2020 and 4682 stops of White drivers. White drivers had twice as many stops as Black drivers; does this mean they are being unfairly treated?

A method for weighting by numbers of group residents is needed. Weighting is achieved by **rates per estimated driver-age resident for the jurisdiction**.

For example, in 2020 the VSR benchmark population for Black drivers in Columbia was 10,449. Black drivers were stopped 2732 times for a rate per resident of 0.26.

This is called a "unit rate." It's one of our most familiar statistics, like a batting average. Each driver experienced on average about a quarter of a stop during the year. A good hitter will have about a third

of a hit in each at bat. We often think of unit rates in terms of 100 or 1000 events. A batting average of .333 is read as 333 hits for each 1000 at bats. **The unit rate of 0.26 for Black stops can be understood as 260 stops per 1000 residents.**

590. 650 requires the VSR to use population benchmarks based on ten-year census data, but the AG now also provides analysis using annual [American Community Survey](#) data which is more up to date.

Estimates of driver-aged residents are not perfect estimates of drivers by group in a jurisdiction. Visitors come from other jurisdictions. Individual use of vehicles varies; public transportation, sharing rides, bicycles and so on are alternatives. Even more accurate estimates are possible using observational studies of drivers on the streets, but these are more difficult and expensive. ACS data appear to be accurate enough in Columbia for flagging concerns.

The VSR requires officers to checkoff whether drivers reside in the jurisdiction, so rates and disproportions will be calculated just for residents, for whom population estimates should be more accurate.

The VSR measures stop disproportions with a “disparity index,” a group’s proportion of stops compared to its proportion of the jurisdiction’s population. Disparity Indexes are discussed in section 6, Alternative Disproportions and Methods of Analysis.

Disproportions are most clearly computed by comparing group unit rates. For instance, the stop rate per Black driver is divided by the stop rate per White driver to determine that Black drivers are stopped at a rate $x.xx$ times the rate for White drivers. Disproportions for all non-White groups are computed this way. The disproportion for White drivers is best expressed as the White rate divided by the Black rate.

For 2020 data, the benchmark population of driver-age White residents of Columbia is 77,947. With 4682 stops, their unit rate is $4682/77,947 = 0.06$ or 60 stops per 1000 drivers.

The stop disproportion for Black drivers is $0.26 / 0.06 = 4.35$. Black drivers were stopped at a rate per estimated driver-age resident 4.35 times the rate for White drivers.

When is a disproportion high enough to require a response from CPD? Because the number of stops is so high, even a much lower disproportion would be statistically significant in descriptive analysis using a chi-square test. The statewide disproportion of 1.71 is much lower than Columbia’s but still high enough to raise concerns.

Just one instance of discrimination is a concern that requires a response, but disproportions flag a different sort of concern. One instance can be addressed by reviewing that incident, but a disproportion indicates a pattern that applies to the whole agency and must be addressed by improving policies, training and supervision to change the agency’s culture.

On the other hand, a high disproportion would be a false positive when, for instance, it is based on documented violations that threaten public safety. A group could have a high disproportion for high-speed violations, but the data confirm that group was committing more violations per driver.

On a practical level, disproportions that are highest and involve the largest numbers of stops need to be prioritized. Disproportions that coincide with complaints or survey results should get a high priority. Stops of young Black males might be an important priority. Odor searches have had very high disproportions against Black drivers in recent years. Consent search disproportions have decreased but they can be reduced to virtual equity—an important victory for bias-free policing.

4. Post-Stop Rates and Disproportions

For post-stop actions (such as writing a citation), rates are best reported as incidents per stop. Rates for contraband found are most clearly presented as contraband found per search.

Rates per stop or per search are not affected by faulty benchmarks for group populations, which makes them more dependable. The VSR follows this procedure; disparity indexes are used only for stops. Arrests, for instance, are measured by arrests per stop.

Post-stop actions take place after officers have been face to face with drivers, so there's usually no question of group identification. Stops are affected by the directions officers receive to patrol certain areas and look for certain vehicles, but officer discretion is sometimes easier to spot in post-stop situations, such as giving a warning instead of writing a citation.

The stop, for instance, might involve a minor violation combined with information the officer had from an agency bulletin. The decision to make a search based on "plain-view" contraband is relatively straightforward. The decision to ask for consent to a search is somewhat more complicated but still can often be assessed by information captured in the data.

Post-stop analysis ignores the disproportions that occur in stops. For instance, in 2020 Black drivers were subjected to consent searches at a rate per stop 1.31 times the rate for White drivers, which might be interpreted as a moderate disproportion that can be given a low priority. But the Black consent search rate per driver-age resident was 5.72 times the rate for White drivers.

Post-stop analysis is needed for its empirical accuracy, but disproportions based on numbers of drivers more accurately capture the experience. Even if there was no post-stop disproportion for consent searches, Black drivers would still be affected by them at a rate per driver more than four times the White rate.

A Black driver might say she had been stopped for a minor violation that would have been ignored if she were White, and then the officer intimidated her into giving up her right to be free from unreasonable searches. The results of the 2018 Columbia survey captured this situation. If CPD wants all community members to partner with officers to fight crime, then it must win trust by treating everyone equally.

5. Incident-Based Data

The **aggregate data** required for the VSR includes just the totals for each group in each category of data collected. Data analysis for the internal purposes of CPD extends to **incident-based data (IBD)**, in which each stop is a database record (or row in a spreadsheet) so that combinations of variables can be considered.

Analysis of aggregate data is, for instance, limited to group disproportions for consent searches. In incident-based data, disproportions can be calculated for consent searches that result in contraband

found. Disproportions can be further focused on gender, age, time of day, beat, and any other variable captured by data. What are the rates and disproportions for each combination of variables? A high disproportion for one combination still does not prove discrimination but flags the situation as one that needs closer examination of the facts the officer acted on.

For instance, before CPD began posting IBD, 2014 VSR data documented that Black drivers in Columbia were subjected to consent searches at a rate per stop 4.39 times the rate for White drivers. The high disproportion flagged possible discrimination, but CPD took no public steps to address the issue. CPD posted IBD for the first time for 2015. IBD allowed rates of contraband found to be computed for consent searches. Hit rates were low for all drivers, but Black drivers were affected by consent searches at twice the White rate, and White drivers were found with contraband at twice the Black rate.⁸

Officers were apparently not basing their decisions to ask for consent on facts that reliably indicated criminal behavior and they could have been applying different standards to groups. No study was performed on the facts officers acted upon. That information was not being collected at the time, but Chief Burton changed procedures on consent searches so that officers became more careful about how they used them and the disproportions declined and hit rates went up.

Descriptive statistics based on aggregate data must act on one variable at a time. Descriptive statistics based on incident-based data can investigate many of the questions addressed by multivariate analysis.

CPD has posted IBD starting with 2015. It was a significant step toward transparency. Few other agencies have been willing to take this step.

The next step is for counts, rates and disproportions to be computed monthly for all categories of data and for combinations of categories in incident-based data that have been identified as concerns, so that stakeholders can easily screen for possible discrimination.

For instance, the supervisor of officers on Beat 20 would get a monthly printout of officers who conducted consent searches—if consent searches continue to have a high disproportion. There will probably be no more than a half dozen consent searches in most beats. The supervisor looks at the incident-based data to see if convincing facts are apparent. The officer, for instance, might have checked off an investigatory stop for a minor violation based on a bulletin instructing officers to look for a specific suspect already under investigation for serious criminal activity. The supervisor might conclude that the request for consent was justified by the bulletin; the officer had credible intelligence. Or the supervisor might decide to review the body cam recording. The officer gets prompt feedback on her use of the consent search, so that she either knows promptly that her action was appropriate or knows she needs to be more careful to act on facts clearly independent of race.

The simple information recorded by checkoffs is enough for an initial screening of incidents by supervisors. If, for instance, disproportions raise concerns about stops for minor violations, then supervisors put a priority on reviewing these incidents. A supervisor might see that the officer also observed several other violations, including one that is clearly a threat to public safety. The supervisor concludes the officer took the time necessary to carefully assess the behavior of the driver before acting.

⁸ See [An Introduction to Columbia Police Department Traffic Stop Data](#). Page 18ff.

If an officer has checked an investigative stop based on an alert from dispatch to follow up on a 911 call, then the supervisor will probably conclude the officer was acting on adequate facts. But if concerns arise, the supervisor would check to make sure the stop really was based on the alert; the vehicle fits the description, location and time agreed with the alert, and so on.

If a disproportion raises concerns about the use of consent searches, the supervisor might see that one officer who performed a high number of consent searches always used them when acting on other facts known about the drivers, for instance, that detectives had issued a bulletin. But if the officer backed up the decisions to ask for consent with observations that the driver was nervous, the supervisor might counsel the officer; if Black drivers look suspicious to an officer at a high disproportion, then the officer might need to be reminded that suspicions are easily caused by racial stereotypes. These sessions between supervisors and officers should be collaborative. The officer gets valuable feedback from the supervisor and the supervisor stays on top of the challenges officers face on the street.

6. Alternative Disproportions and Methods of Analysis

The law that mandates the VSR, 590.650, requires that the AG report disproportions as “**disparity indexes**,” in which a group’s proportion of stops is compared to its proportion of the driver-age population.

For Columbia in 2020, the Black disparity index was 3.41. Black drivers experienced 3.41 times the number of stops one would expect based just on their proportion of the population. The disparity index for White drivers was 0.78; they experienced fewer stops than one would expect.

This information can be useful. It clearly flags a problem that needs to be investigated to see if discrimination contributed to the disproportions. It documents a disproportion between Black stops and Black population, but the question most people want answered is whether there is a disproportion between Black drivers and White drivers.

Disparity indexes can be misleading, especially when comparing jurisdictions in which group populations differ. For instance, in 2013 the disparity index for Black drivers in Ferguson was 1.37, well below the state disparity index, giving the impression that discrimination was not a major problem. But the White disparity index was extremely low, 0.38, suggesting that officers might be ignoring White violations, which is also a form of discrimination.

The problem with the disparity index in Ferguson was that Black drivers are the majority population. Black drivers had 86% of the stops but were 63% of the population: $86\% / 63\% = 1.37$. But if they received 100% of the stops, their disparity index would only be $100\% / 63\% = 1.59$, still lower than the overall state disparity index. Whether White or Black, the majority group always has a deceptively low disparity index.

To fix this mathematical problem, AGs have recommended dividing the Black disparity index by the White disparity index, which presents the Ferguson information as $1.37 / 0.38 = 3.61$. Black drivers were stopped at a rate per driver 3.61 times the rate for White drivers.

For Columbia in 2020, $3.41 / 0.78 = 4.37$. Black drivers are stopped at a rate per driver 4.37 times the rate for White drivers. Except for differences in rounding, this is the same as the disproportion found by

comparing stop rates per driver. The processes of calculating disproportions in stop rates per driver and calculating disproportions by comparing disparity indexes are mathematically equivalent.

This statistic, also called a **ratio of disparity** or odds ratio, is more intuitive and can be computed using just numbers of stops and population estimates, skipping all the proportions. Disparity indexes can be included in analysis but are not necessary.

Note that neither of disparity indexes nor ratios of disparity take into consideration the facts officers act on. They only flag the possibility of discrimination. Once situations have been flagged, attention needs to turn to the facts officers act on.

In recent years, CPD has reported disproportions among groups in **the distribution of types of stops**. Here's a link to the 2019 report on the city website page for the Traffic Stop Committee:
[Columbia Police Department 2018 Traffic Stops Data Breakdown](#)

For instance, in 2018, 15.7% of Black stops were for equipment violations and 13.9% of White stops were for equipment violations. The Black percentage was 1.13 times the White percentage.

Measuring the disproportion with a ratio of disparity, the equipment stop rate per driver-age resident for Black drivers in 2018 was 4.30 times the rate for White drivers. In some circumstances, the CPD disproportions based on the distribution of types of stops might be able to flag a specific concern, but for most analysis, disproportions of stop rates and other officer actions are more informative.

University of Missouri professors have used **multivariate regression analysis** to find situations in which discrimination might be occurring. An MU team determined that statistically significant disproportions in stops occur for young Black drivers, especially at night and when they are in older cars: [Racial Disparity in Columbia, MO Police Department Traffic Stops, 2017-2019](#).

No matter the method of statistical analysis, care must be taken in interpretation; disproportions are just a preliminary indicator that discrimination might be involved. The MU study found that officers with less experience are also more likely to stop Black drivers disproportionately. New officers might be assigned to patrol areas where greater concentrations of Black drivers occur, so the facts officers act on must always be checked. Neither multivariate analysis nor descriptive statistics does the fact check. That's always an additional step.

Other MU professors used multivariate analysis to perform "[Veil of Darkness](#)" studies which concluded there is no strong pattern of officers stopping more Black drivers when daylight might allow them to identify the driver's group before making the stop. In addressing the overall stop disproportion against Black drivers, therefore, officers intentionally targeting Black drivers is unlikely to be the cause of a stop disproportion as high as Columbia's. To address the disproportion, CPD must look for other causes that involve discrimination.

In order to get statistically significant results, multivariate analysis requires large sets of data—hence the use of multiple years in the studies. The analysis is more sophisticated, so experts are needed to set up procedures. But multivariate analysis is especially useful for taking a fresh look at data, without preconceptions of where the problems might be, if any.

Overall, however, the multivariate analysis agrees with the descriptive analysis of simple rates and disproportions that has been available since CPD began posting stop data. In situations in which officers are acting on strong evidence of criminal activity, they are unlikely to treat groups of drivers differently. For instance, Black disproportions in DWIs, in which officers must have certain evidence, have been low in descriptive analysis and were not flagged by the MU team.

In 2020, Black drivers were charged with DWIs at a rate per stop 0.59 times the White rate; White drivers were charged at a rate 1.69 times the Black rate. But historic disproportions have been very high for consent searches, in which officers are not required by law to justify requesting permission to make a search with any facts at all.

Multivariate analysis is needed to confirm routine descriptive analysis. Studies conducted at a minimum of every five years will ensure up-to-date information.

7. Sample Descriptive Analysis and Commentary

Don Love, a member of the Vehicle Stops Committee, has prepared descriptive analyses and commentaries on CPD data for a number of years. Here is the commentary for 2018, posted on the VSC page of the city website:

[An Introduction to Columbia Police Department Traffic Stop Data.](#)

The discussion of consent searches on page 18 is a good example of how CPD can use its data. There is a high disproportion against Black drivers, but White drivers are more likely to be found with contraband. Work with the public data can tease out a few more details but can go no further than flag possible discrimination. With access to the facts officers based their actions on, CPD can let officers know that their facts are credible or that then need to make sure they have convincing facts that are clearly independent of stereotypes: “The crucial aspect of the stop regarding discrimination is whether the officer has or can articulate sufficient reasonable suspicion to justify the detention, paraphrasing CPD’s Bias-Free Policing policy.” (Page 20)

Analysis becomes more difficult to perform (and make sense of) as the data becomes more complicated. In 2020 CPD first provided a breakdown of data by Beats. This interactive spreadsheet allows descriptive statistics to be view for all of CPD or for each Beat:

[2020 CPD Incident-Based Data Analysis](#). (I couldn’t get the link to work. The spreadsheet would have to be in the Cloud for the interactive features to be used.)

Note that the drop-down menus also allow analysis to be viewed by days or by nights. More combinations are possible, for example, contraband found during odor searches for Black male drivers under the age of 30 in Beat 30.

8. Monthly Public Access to Data

Monthly reports will be posted on the city website, so the public can keep track of trends in disproportions to the level of beats.

Public data are redacted to protect individual identities. Perhaps officers can be identified by beat or other assignment information.

The reports include graphs and interactive features (dashboards) to help the public to understand what the data mean.

Staff are available to answer questions.

9. Annual Review

In addition to monthly reports that alert officers and the public to short-term concerns, CPD must, as required by 590.650.5., conduct a periodic review of its VSR data. Annual reviews make sense. Reviews highlight situations in which data indicate that the possibility of discrimination is a significant concern.

In situations in which concerns have been raised, the review reports the number of incidents in which officers were documented as acting on facts which were clearly independent of racial stereotypes, and the number of incidents in which officers were counseled to establish stronger facts in future incidents.

The review includes a discussion of the plan for improving policies, training and supervision to address concerns raised.

10. Officer Feedback by Supervisors

590.650.5.(2)(b) requires agencies to review officer performance based on traffic stop data. The law says agencies are to use disparity indexes; if an officer stops a higher proportion of a group of drivers than its proportion of the population—or its proportion of individuals driving in the jurisdiction--then the agency is to investigate whether the officer is using a minor violation as a pretext to investigate more serious crime.

590.650 says this about reviews of peace officers:

5. Each law enforcement agency shall adopt a policy on race-based traffic stops that:

...

(2) Provides for periodic reviews by the law enforcement agency of the annual report of the attorney general required by subsection 4 of this section that:

(a) Determine whether any peace officers of the law enforcement agency have a pattern of stopping members of minority groups for violations of vehicle laws in a number disproportionate to the population of minority groups residing or traveling within the jurisdiction of the law enforcement agency; and

(b) If the review reveals a pattern, require an investigation to determine whether any peace officers of the law enforcement agency routinely stop members of minority groups for violations of vehicle laws as a pretext for investigating other violations of criminal law;

It's good that the law says agencies need to recognize that proportions of drivers are not necessarily the same as proportions of residents. Ideally, agencies would estimate the group proportions in sections of the jurisdiction, such as beats. Observational studies of drivers are considered the best method of determining group proportions, but they are labor intensive, and would have to be done for multiple beats.

Otherwise, the law tells agencies to look at the wrong things. An officer who patrols a beat with a high concentration of, say, Black drivers is likely to stop a high proportion of them even if each stop is clearly based on facts independent of racial stereotypes—a false positive. An officer patrolling a beat with a low

concentration of Black drivers could stop every one of them for no public safety reason, but still have a low disparity index—a false negative.

Pretext stops are a nation-wide concern for Black drivers who see them as targeting drivers based on race. But they can be an important tool for protecting public safety. Courts accept the legitimacy of pretext stops as long as officers have observed even a minor violation.⁹ The problem with pretext stops arises when they are used disproportionately against Black drivers and officers are not acting on convincing facts, facts clearly independent of race.

590.650 limits performance reviews to stops, but, as seen above, stops are inherently difficult to investigate because of all the factors involved. Post-stop actions are just as important as stops but much easier to assess, so they need to be included in performance reviews.

CPD must satisfy the law, but it can also use the more effective strategy of using disproportions to flag situations in which discrimination might be occurring, then reviewing the incidents to make sure officers are acting on facts.

The law calls for an annual review of officer performance and the BFPP satisfies the requirement, but officers need feedback more frequently; monthly is probably optimal.

Several aspects of the Bias-Free Policing Policy are not written in ways that take advantage of the data CPD has available to document the variable facts officers take into consideration. Other policies cover the reports officers must file, the details of complete performance reviews, procedures for supervision, the objectives of training, and so on, but the BFPP would benefit from additions that explain the importance of checkoffs, the sort of analysis needed to flag disproportions, and how data will be used to give officers feedback on credible intelligence.

11. Self-Reviews by Officers

Officers are often unaware that their actions have a disproportionate impact on groups. From an officer's perspective, many more stops--or consent searches-- are made of White drivers than of Black drivers, so the disproportion against Black drivers is a counter-intuitional surprise. Officers need to see their actions expressed in the objective form of rates and disproportions. They need to see incident-based data on their own actions in order to assess for themselves whether their actions are supported by the facts they knew.

When Columbia officers were first clearly notified that their use of consent searches resulted in a two-fold disproportion against Black drivers, the disproportion immediately began to decrease. If CPD provides officers with information on their individual performance, they will be able to take steps to make sure their actions are based on facts. **Officers will benefit from receiving monthly incident-based data for their stops that involve situations flagged by disproportions for possible discrimination.**

12. Criteria for Credible Intelligence

When does a fact known by an officer qualify as sufficient credible intelligence to support an action? **Criteria are needed for officers to know when facts are enough to support actions, and for supervisors to use when assessing the facts officers act on.**

⁹ See [MICHAEL A. WHREN and JAMES L. BROWN, PETITIONERS v. UNITED STATES](#)

“Credible intelligence” is left purposefully undefined by Dr. Lori Fridell. She intends the concept to cover a broad range of facts. What facts does an officer need to know before using deadly force? What facts does officer need to cite in order for a prosecutor to take a case to court and for a judge or jury to convict? What facts make a search reasonable under the Fourth Amendment— “probable cause” evidence?

A recent Supreme Court Ruling, [Rodriguez v. United States](#), told officers they need to be more careful about using drug-dog alerts, so CPD established criteria for when the alerts are appropriate. Disproportions disappeared quickly in Columbia and across the state.

Credible intelligence also includes “reasonable suspicion,” or the “specific and articulable facts” that the Supreme Court determined were necessary to justify a quick pat-down search in the Terry case.

Officers need cite no facts to support a decision to ask for consent to a search; the judge will accept the validity of evidence found in a consent search, as long as consent was freely given. But under the Bias-Free Policing Policy, officers must cite the facts that led them to ask for consent. Similarly, officers are given the discretion to use “pretext stops”—stops in which a minor violation is used as the reason to make a stop intended to provide an opportunity to investigate a driver for other criminal activities—but they must articulate credible intelligence.

These high discretion situations would not trigger a review except when high disproportions flag possible discrimination. Then the issue is not whether the officer has the power to begin an investigation but whether racial stereotypes distracted the officer from credible intelligence.

Criteria for facts necessary to justify use of force are set by laws and court precedents, but agencies still need to spell them out in policies and training. Criteria are needed for when a warning, citation or arrest is appropriate. These items are already addressed in CPD policies.

Criteria for consent and odor searches might still need to be developed—and for other situations flagged by disproportions. CPD might be breaking new ground when it writes them. Command staff, supervisors and officers will have to go through a process to determine what criteria are necessary to protect public safety while still protecting vulnerable individuals from discrimination. An outside examiner or a volunteer committee is not in a position to write policy, although suggestions are appropriate.

13. Command Staff Performance

Disproportions can be caused by policies, training and supervision established by command staff. Officers until recently were told that racial profiling did not occur as long as they had observed even the most minor violation, but that old racial profiling policy has been replaced by the Bias-Free Policing Policy, which clearly tells them that the same standards must be applied to everyone.

All institutions develop their own cultures which resist change. A policy change is not enough to guarantee bias-free policing. Command staff must lead toward full implementation of policies designed to prevent discrimination.

No-tolerance stops in high crime areas have sometimes been suggested as factors in CPD’s stop disproportions. Concentrating officers where crimes occur makes sense, but command staff can be

distracted by racial stereotypes, just like anyone else. Dr. Lori Fridell says agencies must be careful to start with objective documentation of where violations are concentrated so they can assign officers most effectively.¹⁰

Inadvertent factors can also contribute to disproportions, without any intention of committing discrimination. For instance, when officers came to the headquarters in the District for shift changes, many of them drove through areas with high concentrations of Black drivers, which could have contributed to disproportions. Now that shift changes occur at the North and South Patrol Bureaus, disproportions might decline.

Actions at all levels of officer responsibility can be affected by racial stereotypes. Officers must check their facts before asking for consent. Command staff must check their facts before assigning patrols.

14. Survey Data

Traffic stop data cannot include actions officers do not take. It's possible to tell when an officer stops a Black driver for a minor violation but not when the officer ignores the same violation for a White driver. Survey data helps fill this gap.

In the [2018 Columbia city survey of residents](#), a group of 1000 randomly selected residents answered questions about a variety of issues. One of the questions was whether they had been stopped by a Columbia officer in the preceding year. About 100 of them said yes. Those were asked if they viewed the stops as legitimate. The sample size is small, but Black residents said their stops were not legitimate at a rate 5 times the rate for White residents.

Researchers¹¹ have determined that by Illegitimate, Black drivers mean that the stop was for a minor violation that had no public safety value and is ignored for White drivers, and that the officer was primarily interested in interrogating them.

The MU traffic stop data group recommended that Columbia conduct more detailed surveys of residents and officers to find out more about the “qualitative” side of traffic stops—see their recommendations 6 and 7. Why do Black drivers in Columbia consider a stop illegitimate? What do officers think about their responsibility to deliver equal protection? What steps are necessary to build the mutual respect and trust necessary for a healthy community?

15. Conclusion

Columbia officials consistently promote racial equity in law enforcement. [The Mayor's Task Force on Community Violence](#) concluded that the root causes of violence are socioeconomic so officers cannot protect public safety on their own; they need community support. City Council supports community policing, in which officers are problem solvers, not primarily warriors.

¹⁰ Fridell, Lorie. (2017) *Producing Bias-Free Policing: A Science-Based Approach*. Switzerland: Springer International Publishing. See the sections on operational bias and high-discretion, crime-control-focused actions pages 81-85.

¹¹ Epp, Charles R.; Maynard-Moody, Steven; Haider-Markel, Donald P. (2014-04-04). *Pulled Over: How Police Stops Define Race and Citizenship* (Chicago Series in Law and Society) University of Chicago Press. Kindle location 201ff; page 3ff. See also pages 127-133 for a discussion of perceptions of legitimacy.

But Black residents don't trust officers to make legitimate traffic stops, according to the city survey. If CPD develops the capacity to collect, analyze and apply data, everyone will have the objective facts needed to tell when discrimination might be occurring, and officers will receive the feedback they need to identify facts and ignore stereotypes.

Data can work both ways. Traffic stop data now document problems but if CPD applies what it learns from collecting and analyzing data, disproportions will decline. As Black residents come to recognize they are being treated fairly, survey results will improve. All community members will increasingly work with officers to protect public safety.

Don Love 5/5/22