

West Virginia Traffic Stop Study Final Report

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Criminal Justice Statistical Analysis Center

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Full Report

The full report including the overview of statewide findings and all statistical tables detailing the results for all West Virginia law enforcement agencies can be accessed online at: www.wvdcjs.com/trafficstops.

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Report Highlights

Statewide Results

A total of 301,479 traffic stops of WV registered vehicles were accepted for analysis from 348 state, county, and local law enforcement agencies during the April 2007 through September 2008 time period.

The majority of the 301,479 reported stops occurred on US/WV routes (61.5%). Just over 20.0% of stops were on city streets (22.3%), while 11.2% of stops took place on an interstate roadway.

Statewide the majority of drivers stopped by law enforcement were white (93.8%). Black drivers accounted for just 4.3% of stops. Less than 2.0% of all drivers were of some other race.

State-level results indicate that black drivers are 1.64 times more likely to be stopped by law enforcement compared to white drivers. Hispanics were 1.48 times more likely to be stopped compared to white drivers.

Once stopped, only 4.6% of all accepted stops resulted in some type of search. A total of 13,990 searches of vehicles, drivers, and/or passengers were conducted over the 18-month period between April 2007 and September 2008.

Nearly ninety percent of searches involved white drivers (87.3) while slightly less than ten percent were comprised of black (9.8%) and Hispanic drivers (2.2%).

The search rates for black and Hispanic drivers were 10.64 and 10.24 respectively, compared to 4.32 for white drivers.

Black and Hispanic drivers were 2.45 and 2.37 times more likely to be searched respectively, once stopped by law enforcement compared to white drivers.

In 53.6 % of all searches, no contraband was found.

While the rate of searches was higher for black and Hispanic drivers compared to white drivers, the contraband hit rate was lower. The contraband hit rate for black and Hispanic drivers was 43.11 and 30.23 respectively compared to 47.17 for white drivers.

Black and Hispanic drivers were more likely to receive a citation and/or be arrested once stopped by law enforcement. The rate of citation and/or arrest was greater for black (57.34) and Hispanic drivers (60.92) compared to white drivers (46.52).

Most often, consent was the authority under which a law enforcement search was conducted (51.2%). Consent was used as the authority to search at nearly an equal rate for black (49.1%) and white drivers (51.8%).

County Level Stop and Search Results

Analysis of the 301,479 traffic stops by county indicated that a majority of counties have no disparity for nonwhites. In terms of law enforcement stops, disparity ratios were greatest in Barbour (2.17), Berkeley (2.39), Hardy (3.47), Jefferson (1.90), Preston (1.75), and Summers counties (1.90).

Report Highlights

County level analysis of all law enforcement traffic stops over the 18-month period indicated widespread disparity in vehicle searches. A vast majority of the 55 WV counties reported some level of disparity in vehicle searches.

Minority drivers were two and one half times to six times more likely to be searched compared to white drivers in ten WV counties. Search disparity ratios in all vehicle stops were greatest in the following counties: Calhoun (6.93), Doddridge (3.30), Gilmer (2.95), Hardy (3.50), Mason (2.49), Mineral (2.56), Mingo (3.20), Pleasants (5.54), Randolph (3.04), and Wirt (6.38).

Minority drivers were searched twice as often as white drivers in Boone (2.13), Fayette (2.24), Greenbrier (2.41), Hampshire (2.45), Kanawha (2.18), Mercer (2.28), Ohio (2.43), Preston (2.21), Tyler (2.38), and Wood counties (2.14).

Agency Level Stop and Search Results

Of the municipal police departments, Charleston PD (16,738) reported the greatest number of traffic stops followed by Beckley PD (10,957) and Martinsburg PD (6,439). Despite being the second most populated WV municipality, the City of Huntington reported the least number of traffic stops of all other principal cities. Huntington PD reported only 1,308 or 7.8% of the number of traffic stops reported by Charleston PD.

For the seven principal cities in WV, disparity in searches by law enforcement was greater than the disparity found in vehicle stops. Black drivers were at least twice as likely as white drivers to be searched by law enforcement in all seven principal cities.

Among the seven principal cities, Parkersburg PD had the largest stop disparity ratio for black drivers at 2.10 indicating that black drivers were slightly over twice as likely to be stopped compared to white drivers. Stop disparity ratios for the other principal cities were as follows: Beckley (0.55), Charleston (.87), Huntington (1.57), Martinsburg (1.94), Morgantown (1.58), and Wheeling (1.71).

At a city-level analysis, little or no disparity in traffic stops was found for drivers stopped by Charleston PD or Beckley PD.

While on the aggregate or city-level Charleston PD had little or no disparity in traffic stops, black drivers were three times more likely to be stopped than white drivers in patrol areas 002 (North Charleston area) and 010 (South Ruffner to Route 119).

While black drivers were 1.94 times more likely to be stopped by Martinsburg PD, black drivers were two and three times more likely than white drivers to be stopped in patrol areas 222 (Oatesdale Park, War Memorial, and Lake Thomas areas) and 333 (Shepherd Community College, Ambrose Park, and Martinsburg Mall and High School areas), respectively.

In terms of searches, disparity was found for the top three reporting municipal agencies. Search disparity ratios for black drivers were 4.92 for Charleston PD, 2.20 for Beckley PD, and 2.42 for Martinsburg PD. Search disparity ratios for the other principal cities were as follows: Parkersburg (3.64), Huntington (2.49), Morgantown (2.27), and Wheeling (2.22).

Report Highlights

Despite the higher search rates for black drivers, Charleston PD, Beckley PD, Huntington PD, and Wheeling PD had lower contraband hit rates for black drivers compared to white drivers.

In all Charleston PD patrol areas, black drivers were more than twice as likely as white drivers to be searched by law enforcement. In five patrol areas (002, 004, 005, 010, 011), black drivers were at least five times as likely to be stopped by police compared to white drivers.

Of the county sheriffs reporting, the Putnam County Sheriff's Department (6,929) and Kanawha County Sheriff's Department (6,003) made the greatest number of stops followed by Upshur County (3,087).

Of the stops made by the Putnam County Sheriff's Department, black drivers were 2.45 times as likely to be stopped as white drivers. For the Kanawha County Sheriff's Department, the stop disparity ratio for black drivers was 1.11. No stop disparity was indicated for black drivers as reported by Upshur County.

In terms of search disparity ratios, black drivers were three and one half times more likely than white drivers to be searched by the Putnam County Sheriff's Department, compared to 1.31 times more likely by the Kanawha County Sheriff's Department. No disparity in searches was found for the Upshur County Sheriff's Department.

The higher search rates for black drivers reported by the Putnam County and Kanawha County sheriff's departments coincided with higher hit rates for black drivers.

Over 5,000 stops were reported by state police detachments in Martinsburg (7,381), Logan (6,174), Bridgeport (5,390), South Charleston (5,372), and Parkersburg (5,119). Disparity was found in stops of black drivers for all of these detachments, except South Charleston.

Search disparity was found for black drivers in stops reported by all five of the top reporting state police detachments. Search disparity ratios for black drivers were as follows: Martinsburg (1.44), Bridgeport (1.44), Logan (2.40), South Charleston (3.09), and Parkersburg (4.58).

Despite black drivers being three to four times more likely to be searched by South Charleston and Parkersburg state troopers, contraband hit rates were lower for black drivers compared to white drivers.

West Virginia Traffic Stop Study: 2009 Final Report

Overview of Statewide Findings

Background

In response to concerns voiced by WV citizens and the WV Legislature regarding allegations of racial profiling by law enforcement, the West Virginia Legislature passed the Racial Profiling Data Collection Act [W. Va. Code §17G-2-3]. The Racial Profiling Data Collection Act and Legislative rule §149 CSR 5 required *all* law enforcement officers to begin gathering information on all traffic stops beginning January 1, 2007. Pursuant to W. Va. Code §17G-2-3, the Legislature mandated the Governor's Committee on Crime, Delinquency and Correction [hereafter referred to as the Division of Criminal Justice Services or (DCJS) as staff of the Governor's Committee] and the Criminal Justice Statistical Analysis Center, a unit of the Governor's Committee, to develop a methodology for the study of law enforcement traffic stops in the state, conduct an analysis of the data collected, and produce an interim and final report to the Legislature.

W. Va. Code §17G-2-3 and Legislative rule §149 CSR 5 established standards for the collection, reporting, compilation and analysis of data, for the purpose of studying the possible practice of racial profiling by law enforcement in West Virginia. Beginning January 1, 2007, each time a law enforcement officer stopped the operator of a motor vehicle for a violation of any motor vehicle statute or ordinance officers were required to complete a West Virginia Motor Vehicle Stop Form (MVSF). The MVSF gathers information on various elements of the stop, including the race of the vehicle driver and any passengers ([see Motor Vehicle Stop Form](#)).

This report presents the results of analysis on traffic stop data collected by law enforcement officers. The purpose of the analysis is to provide statistics that summarize whether and/or to what extent racial disparity is present in law enforcement traffic stops and post-stop outcomes (i.e., searches, dispositions, and contraband hit rates) by law enforcement agency. This report provides statistics for traffic stop data collected by law enforcement officers over an 18-month period between April 2007 and September 2008.

Data Collection

The collection of reliable and valid data is essential for proper analysis of traffic stops. Efforts to ensure the quality of data gathered often involves: selecting an appropriate mechanism for data collection, developing the data collection instrument, conducting a pilot test, training officers to use the data collection instrument(s), minimizing officer disengagement, and developing a data auditing system. However, many traffic stop studies have been plagued by poor data quality because they have not been able to develop adequate mechanisms for ensuring data quality due to the sheer size and scope of the effort. There are a number of strategies and common practices available for monitoring data quality, however, many of these techniques proved to be very difficult to implement given the statewide focus of the current analysis.¹ Nonetheless, considerable effort was given to monitoring traffic stop submissions in an attempt to maintain some level of data quality.

Efforts to Improve Data Quality

Legislative rule §149 CSR 5 charged the WV Division of Motor Vehicles with the task of ensuring the accurate and reliable collection of traffic stop data submitted by law enforcement officers across the state. The Division of Motor Vehicles secured a vendor for the scanning and data collection, developed the Motor Vehicle Stop Form, printed and distributed the forms, instructions and a training CD to every law enforcement agency in the state. Each agency was asked to designate a contact person. While a majority of law enforcement agencies did provide a contact person, there were several who did not respond to the DMV's initial effort. The DMV maintained monthly communication with each participating agency. Each agency was advised of the number of submissions, rejections and percentages of rejections for each month. If submissions appeared to be lower than past submissions or lower than the submissions of agencies near the same size and similar mission, they were identified as "low reporting" agencies. This information was communicated with the chief executive of that agency.

To better ensure compliance and provide law enforcement agencies with all necessary information on completing and submitting MVSFs, the DMV developed a webpage with basic information on the Racial Profiling Data Collection Act and training ([For more information on MVSF instructions and training procedures, see WV Department of Transportation Racial Profiling Website](#)). The DMV website continues to host a copy of the Law, Legislative Rule, PowerPoint training presentation on completing the MVSF, frequently asked questions, contact information, directions based on agency size, list of county numbers, and links to every other involved agency. In July 2007, the DMV began implementation of electronic submission of the MVSFs and by the end of 2008 most agencies forms were being submitted electronically.

Preparing the Traffic Stop Data for Analysis

Law enforcement officers began submitting MVSFs to the Division of Motor Vehicles on January 1, 2007. Submission of MVSFs involved mailing the forms to the DMV to be scanned and read into a database. Once a MVSF was scanned, the form would either be accepted or rejected depending on whether it contained missing information or could be read by the scanning software. If rejected, the MVSF would be sent back to the submitting agency for correction and resubmission. Only accepted MVSFs were eligible for analysis and included in the final sample of traffic stops. As of December 2008, a total of 357,063 MVSFs were submitted to the DMV. Of these, a total of 290,363 or 81.3% were accepted for analysis ([see Total Number of Traffic Stops and Rejection Rates](#)). Nearly all active law enforcement agencies in the state participated to some degree in the data collection effort.

Once MVSFs were submitted to the DMV by law enforcement agencies, several additional steps were necessary to prepare the traffic stop data for analysis. A review of the MVSFs submitted by month further revealed that the number of MVSFs rejected declined considerably after the first few months of data collection. Given the large number of rejected forms in January through March 2007, these forms were excluded from the analysis due to validity concerns ([see Total Number of Traffic Stops and Rejection Rates](#)). Moreover, the number of traffic stops reported after September 2008 was considerably lower than in previous months due to a lag in the submission of paper MVSFs and the time involved in the scanning process. Hence, the traffic stops made in April 2007 through September 2008 were chosen for analysis and are included in this report. A total of 242,082 MVSFs, plus an additional 153,714 electronic records were submitted and subsequently accepted during this 18-month period for a total of 395,796 traffic stops.

Of the 395,796 accepted traffic stops from April 2007 through September 2008, a total of 301,479 or 76.2% were of vehicles with WV registration ([see Vehicle Registration by Agency](#)). These traffic stops served as a basis for the statewide and county level analyses. Given that the benchmark by which traffic stops are compared in this report utilizes adjusted Census data, the 94,317 traffic stops involving vehicles with out-of-state or no registration were removed from the analysis ([see Out-of-State Traffic Stops by Agency and Race](#)). Finally, agencies that reported fewer than 50 traffic stops during this 18-month period were excluded from the agency level analysis ([see Agencies Reporting Fewer than 50 Stops of WV Registered Vehicles by Race](#)). For a distribution of the total number of stops by agency, including agencies with less than 50 reported stops, see [Traffic Stops of WV Registered Vehicles by Agency](#) and [Traffic Stops of WV Registered Vehicles by County of Stop](#). For all agency level analyses, a total of 300,362 traffic stops were examined and the results are shown in all Key Disparity Indicator and Frequency Information tables by agency. These stops were submitted by 193 city/county level agencies and 65 state police detachments (agencies with over 50 total stops).

Sub-area Analysis of Traffic Stops

Prior research has shown the importance of conducting sub-area analyses of traffic stop data. Sub-area analysis deals with the specific location of traffic stops and often involves the examination of data gathered on a smaller geographic unit than a city or county such as Census tract or block. Sub-area analysis has been shown to be important because racial disparities may be very strong in some areas, but go largely undetected at the aggregate level. This becomes particularly important in areas (cities or counties) with large resident populations, greater racial/ethnic heterogeneity, and in areas with differing levels of stop activity by law enforcement. Such an analysis also controls for the volume of stopping activity which may bias results when aggregated. Therefore, when it is feasible and warranted, it is important to conduct sub-area analyses so that it is possible to compare areas with equal levels of vehicle stop activity and level of minority representation.

For the purposes of this report, six principal cities (defined as located within a MSA), the City of Beckley, and sheriff's departments located in the counties in which these cities reside were selected for the patrol area analysis. Each of these agencies are located within a MSA, generally reported more traffic stops, and submitted patrol area information for analysis. While not located within a MSA, Beckley PD and the Raleigh County Sheriff's Department were added to the patrol area analysis due to the large number of stops reported during the time period analyzed. This also allowed for agency representation from the southern part of the state. Agencies included in the sub-area or patrol area analysis are: Charleston PD, Kanawha Co SO, Huntington PD, Cabell Co SO, Parkersburg PD, Wood Co SO, Martinsburg PD, Berkeley Co SO, Morgantown PD, Monongalia Co SO, Wheeling PD, Ohio Co SO, Beckley PD, and Raleigh Co SO ([see Sub-area Analysis of Selected Principal City and County Law Enforcement Agencies](#)).

Benchmarking with Adjusted Census Data

In order to determine whether the number of minority traffic stops is disproportionate to what would be expected if no bias was present, traffic stops need to be compared to a benchmark. The benchmark serves as a comparison group for the stop information collected on MVSFs and is simply the "expected probability" of being stopped by police. That is, the benchmark

represents the “expected” rate of minority stops, assuming no bias. While there are many types of benchmarks used in racial profiling studies, the present analysis compares traffic stops to adjusted Census data.² Given that all police agencies and officers across the entire state were required to submit information on traffic stops, an adjusted Census benchmarking approach was the only feasible method for analyzing these traffic stops.

For the purposes of this report, law enforcement traffic stops were compared to 2000 Census data adjusted by vehicle ownership. The Census data was adjusted by *vehicle ownership* in an effort to compensate for the differences in the residential and driving population. Information on household vehicle ownership was used to obtain an estimate of the number residents that owned vehicles by race. In order to make the appropriate adjustments, household data on vehicle ownership from the 2000 Census was converted to reflect vehicle ownership on an individual level. Information on the number of households without vehicles and the average number of individuals per household by race was used to adjust the residential population to obtain a better estimate of the driving population.

Efforts to obtain an appropriate comparison for reported traffic stops were further complicated by the need to account for a variety of law enforcement agencies with different levels of jurisdiction and population size. For most agencies, traffic stops were compared to the adjusted population for the entire city or county in which each agency was located.³ While the state police technically has statewide jurisdiction, a vast majority of reported traffic stops occurred in the county where the detachment was stationed. Thus, traffic stops reported by the state police were benchmarked to the adjusted Census population for the county in which the detachment was located. In addition, two agencies were benchmarked to the adjusted Census population for the state, WVSP Special Ops and the Public Services Commission - Charleston due to having statewide jurisdiction and reporting stops in multiple counties. Likewise, three campus police departments reported greater than 50 traffic stops and are included in the city/county frequency and indicator tables. These agencies were benchmarked to the city in which they are located (Marshall University Police to Huntington, West Virginia University Police to Morgantown, and Potomac State College to Keyser).

Finally, principal cities (defined as being located within a MSA) and the sheriff’s departments for the county in which these cities are located were selected for sub-area analysis. This involved the analysis of multiple patrol areas for agencies that generally had more reported stops, were located in areas with larger minority residential populations, and had considerable variability in stopping activity in their respective jurisdictions. Agencies included in the patrol area analysis are: Charleston PD, Kanawha Co SO, Huntington PD, Cabell Co SO, Parkersburg PD, Wood Co SO, Martinsburg PD, Berkeley Co SO, Morgantown PD, Monongalia Co SO, Wheeling PD, Ohio Co SO, Beckley PD, and Raleigh Co SO. Census tract information was used to establish benchmarks for each of the patrol areas designated by these agencies.⁴

Calculation and Interpretation of Key Indicator Tables

A total of 301,479 traffic stops reported by law enforcement from April 1, 2007 through September 30, 2008 served as a basis for the statewide and county level analyses. For all agency level analysis, a total of 300,362 traffic stops submitted by law enforcement were examined. These traffic stops represented 193 city/county level agencies and 65 state police detachments. For the purposes of this report, all reactive as well as proactive stops are considered in the analysis.⁵ The analysis is divided into two parts: 1) a stop analysis which examines “who is stopped” by race and 2) a post-stop analysis that examines “what happens

after a person is stopped” by police. This involves analyzing whether disparity is present in the number of searches, search/disposition outcomes, and contraband hit rates.

To ascertain whether disparity is present in traffic stops or post-stop outcomes, it is necessary to compare the traffic stops to an appropriate benchmark and calculate a variety of indices and ratios that assist in the interpretation of the results. Such indices and ratios assist in drawing conclusions about disparity in stops and outcomes but *not* the cause of the disparity. That is, even when racial disparity is demonstrated in traffic stops using these calculations, the cause(s) of the disparity is not often known (and may never be known) based on the current data available. As a result, it is unclear whether any disparity in traffic stops or outcomes across race is due to police bias or other possibly legitimate factors associated with law enforcement practices. Nonetheless, the calculation of such indices and ratios will aid in the interpretation of whether disparity is present or absent in traffic stops and outcomes across law enforcement agencies. The following is a brief description of calculation and proper interpretation for each of the indices and ratios presented in this report:⁶

Stop Disparity Index. This index is used to estimate the differences between the “actual” and “expected” rates of traffic stops for different racial groups. Using traffic stop data as the numerator and benchmarks as the denominator, an index can be calculated to identify the presence or absence of disparity. A disparity index of 1.0 indicates no disparity. A disproportionality index that is greater than 1.0 indicates that the rate of stops for particular groups is *greater than expected* based on the benchmark. A disproportionality index that is less than 1.0 indicates that the rates of traffic stops for particular groups is *less than expected* based on the benchmark. The larger the absolute size of the disproportionality index, the larger the disparity between the actual and expected rate of stops. A disparity index of 0 indicates that no stops were reported for that racial group and thus no comparison to the benchmark can be made. The stop disparity index is calculated by dividing the percentage of total traffic stops by the benchmark (i.e., percentage of total stops / benchmark).

Stop Disparity Ratio. While the disproportionality index provides a general comparison between minority and majority groups, it is not easily interpretable. In addition to a disparity index, therefore, a disparity ratio is also calculated for the analysis presented in this report. A ratio is calculated by comparing each minority racial group separately (numerator) to the “white” racial group (denominator).⁷ A disparity ratio provides a more clear interpretation of the likelihood of a minority driver receiving an outcome when compared to a majority driver (i.e., “white” driver). As with the disproportionality index, a ratio of 1.0 indicates no disparity, while values above 1.0 suggest a disproportionate outcome for the minority group. The larger the absolute size of the disproportionality ratio, the larger the disparity between the actual and expected rate of stops. For example, a disparity ratio of 1.56 for the black racial group indicates that blacks are stopped 1.56 times more than whites. Alternatively, this can be stated as “if you are black, you are 1.56 times more likely to be stopped by police than if you are white” or “for every white person stopped, 1.56 blacks are stopped.” The stop disparity ratio is calculated by dividing the stop disparity index for each minority racial group by the stop disparity index for the majority racial group or, in this case, whites (i.e., stop disparity index minority / stop disparity index majority). A stop disparity ratio of 0 indicates that either no stops were reported for a particular minority group or that there were no stops of the majority group (whites) for comparison.

While examining the disparity in actual traffic stops is important, concerns of disparate policing practices do not end with the initial traffic stop. Instead, post-stop outcomes are an important consideration of any traffic stop data collection effort because the potential exists for

differential treatment based on the drivers' race after the initial stop has taken place. Therefore, in addition to benchmark comparisons of traffic stop data, analyses of post-stop outcomes (e.g., dispositions and searches) must be conducted. Similar to a disparity index and ratio for traffic stops, these calculations can also be produced for searches. However, instead of comparing traffic stops to a benchmark, search indices and ratios utilize the total number of stops compared to the total number of searches. Interpretation of the search index and ratio remains the same.

Search Disparity Index. Using the percentage of total searches as the numerator and the percentage of total traffic stops as the denominator, an index can be calculated to identify the presence or absence of disparity in law enforcement searches. Interpreted in the same way as the stop disparity index, a disproportionality index that is greater than 1.0 indicates that the rate of searches for a particular racial group is *greater than expected* based on the percentage of total traffic stops for each group. A disparity index of 0 indicates that no searches were conducted for that racial group. The search disparity index is calculated by dividing the percentage of total searches by the percentage of total stops (i.e., percentage of total searches / percentage of total stops).

Search Disparity Ratio. Similar to the calculation of disparity ratios based on stops, the calculation of a disparity ratio for searches is also possible. A ratio of 1.0 indicates no disparity in searches, while values above 1.0 suggest a disproportionate outcome for the minority group. The larger the absolute size of the disproportionality ratio, the larger the disparity between the actual and expected rate of searches. The search disparity ratio is calculated by dividing the search disparity index for each minority racial group by the search disparity index for whites. In this regard, whites form the reference group for which the other racial groups are compared. A search disparity ratio of 0 indicates that either no searches were conducted for a particular minority group or that there were no searches of the majority group (whites) for comparison.

Additional methods for assessing post-stop outcomes involve the simple comparison of search rates and outcomes such as citations/arrests and whether contraband was found as the result of a search. Such analyses examine differences in outcomes for different types of drivers. Thus, it is important to examine all individuals stopped by police to determine the proportion of those individuals who are searched, and subsequently the proportion of those searched individuals who were discovered to be carrying or transporting contraband (i.e., contraband hit rate). If drivers were searched strictly based on legal factors and suspicions unrelated to race, one would *expect* similar percentages of searches resulting in seizures across racial groups. Moreover, disposition information including whether an arrest/citation was given to a driver versus other possible dispositions can be analyzed to determine whether disparity is present in dispositions by race. This is done by simply comparing the citation/arrest rate across the different racial groups.

Search Rate. The search rate simply compares the rate of searches across each racial group. Disparity in searches is indicated by large differences in the percentage of minority versus majority motorists searched as the result of a traffic stop. The search rate is calculated by dividing the total number of searches by the total number of stops then multiplied by 100 [i.e., (number of total searches / number of total stops) *100].

Citation/Arrest rate. This calculation compares the dispositions received by motorist across racial groups. If large differences in dispositions are present across racial groups, disparity may be present. The citation/arrest rate is calculated by dividing the total number of

citation/arrests by the number of total stops then multiplied by 100 [number of citation/arrests / number of total stops) *100].

Finally, researchers can use “hit rates” to determine if unjustified disparity is present. Hit rates are the percentage of searches that result in a hit (i.e., having actually found contraband of some sort). In conducting an analysis of hit rates it is possible to determine whether searches are more productive for one racial group than another and, in turn, if possible unjustified disparity is present. If only “evidence-based searches” rather than race is being used as reasons to warrant searches, then the assumption is that “hit rates” should be similar to the proportion of searches for each racial group. When a high search rate is found for a particular racial group, coupled with a low “hit rate,” such a result would suggest that further exploration might be warranted. For example, if searches of black motorists are “less productive” as indicated by a low hit rate compared to searches of white motorist then unjustified disparity may be present, particularly if the search rate for black motorist is disproportionately higher when compared to whites. To conduct such an analysis involves a simple comparison of searches that result in seizures across racial groups.

Contraband hit rate. The contraband hit rate is related to whether something was found as a result of a vehicle/passenger search. The contraband hit rate is calculated by dividing the total number of contraband hits by the total number of searches then multiplied by 100 [i.e., number of contraband hits / number of total searches) *100].

Summary of Statewide Results

A total of 301,479 traffic stops of WV registered vehicles were accepted for analysis from 348 state, county, and local law enforcement agencies during the April 2007 through September 2008 time period. Of these, 61.3% (184,905) were submitted using the paper scantron forms. The remaining 38.7% (116,574) were submitted through the electronic system which was implemented in July 2007.

As explained earlier, a greater proportion of stops were made in the month of May each year due to a targeted enforcement effort. Otherwise, there was on average 16,136 accepted stops reported each month during this 18-month time period.

More stops occurred between the hours of 4:00 PM and 10:00 PM. The greatest number of stops was reported during the 5:00 PM hour (6.6%). On average about 4.6% of stops occurred each hour between 8:00 AM and 3:00 PM. Few stops were reported during the overnight and early morning hours.

By far the majority of stops occurred on US/WV routes (61.5%). Just over 20.0% of stops were on city streets (22.3%), while 11.2% of stops took place on an interstate roadway. The remaining 5.0% were reported as occurring on some other type of roadway.

Speeding was the most commonly reported reason for a vehicle being stopped (44.3%). Other moving violations accounted for 13.0% of stops while 33.3% were for other nonmoving violations. Another 8.2% of stops involved red light or lane violations. Penal code violations made up the remaining 1.2% of stops.

On average accepted traffic stops lasted 11 minutes. Drivers were nearly equally likely to receive a warning (49.5%) as to be cited/arrested (47.2%). Only 3.3% of stops resulted in some other outcome.

Once stopped, only 4.6% of all accepted stops resulted in some type of search. The vehicle was most often the target of the search (90.9 %). Drivers were searched in 78.3% of all stops resulting in a search. Only 26.9% of stops resulting in a search involved a search of passengers. Personal effects were searched in 19.4% of stops resulting in a search.

Most often, consent (51.2%) was the authority under which the search was conducted. Incident to arrest (21.3%) was the next most commonly reported search authority. Inventory (7.7%) and probable cause (9.4%) were each reported as the search authority in fewer than 10.0% of searches. Plain view (5.4%), reasonable suspicion/weapon (3.2%), and other (1.6%) were also reported as the search authority.

In 53.6 % of all searches, no contraband was found. Illegal drugs were found in 22.6% of searches while 18.5% uncovered drug paraphernalia and in 15.0% alcohol was found to be present. Firearms (1.8%) and other weapons (2.6%) were found infrequently as was currency (1.1%), stolen property (0.8%), and other contraband (2.1%).

The majority of the drivers involved in these stops were male (63.7%). Female drivers were underrepresented compared to the population of the state at only 36.3%.

Statewide the majority of drivers of stopped vehicles were white (93.8%). Black drivers accounted for just 4.3% of stops. Less than 2.0% of all drivers were of some other race.

The average age of drivers involved in these traffic stops was 36 while the most frequently reported age was 20. Juveniles (age 17 and under) accounted for just 2.8% of all drivers. Individuals between the ages of 25 and 39 made up the greatest proportion of all drivers at 37.3%. Those in the next older age group, 40 to 59 year olds, accounted for 30.0% of stops. Younger drivers, 18 to 24 year olds, made up 23.3% of stops. Only 6.6% of stops involved drivers age 60 and older. An invalid age was reported for 78 cases that were excluded from this analysis.

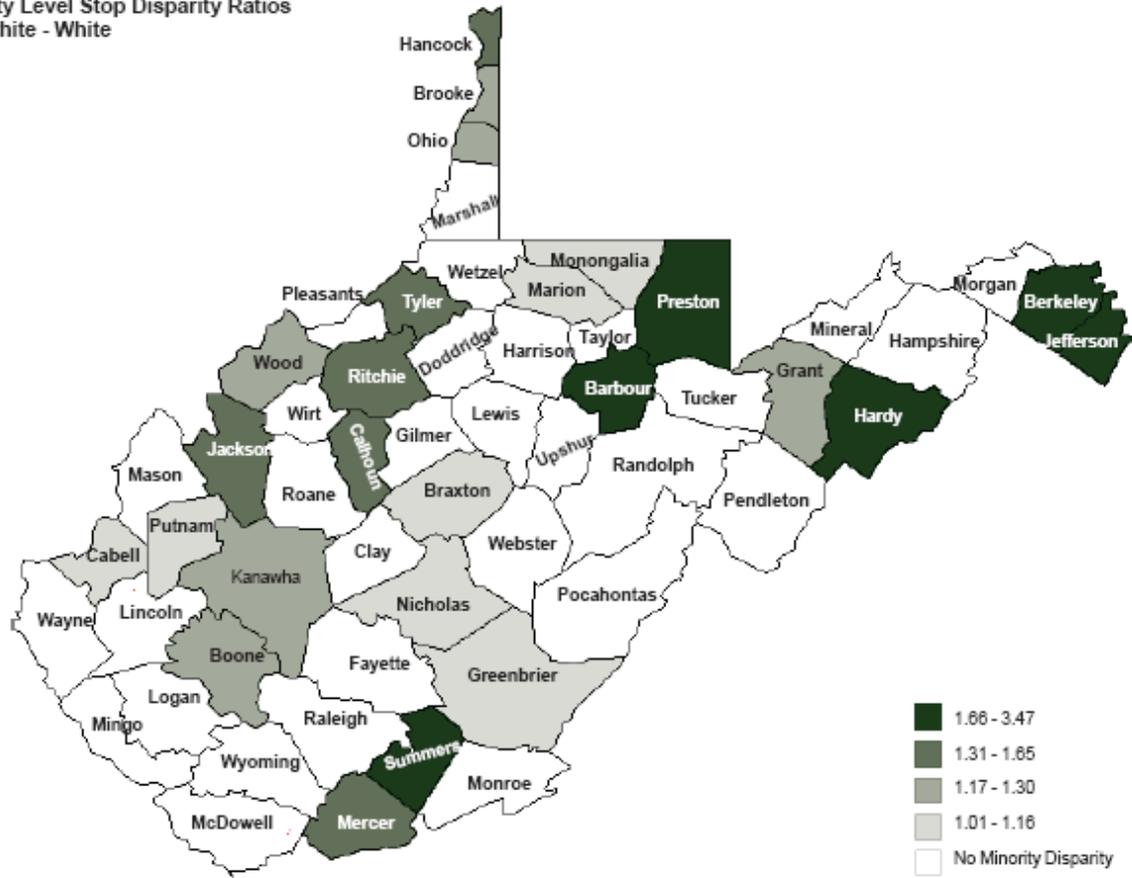
The following table provides an overview of the key indicators at the state level. This same information is provided in a separate table at the agency level for those agencies submitting 50 or more accepted stops during the 18-month period analyzed. Stop, search, citation/arrest, and contraband hit counts are provided by race and in total. Benchmarks are based on an adjusted Census population for the state of 1,616,435. In addition, calculations for various standard measures of disparity are illustrated at the state level below.

Key Indicators	Total	White	Black	Asian	Native American	Hispanic	Other
Stop Information							
# of Total Stops	301,479	282,709	12,946	889	121	2,940	1,874
% of Total Stops	100.0%	93.8%	4.3%	0.3%	0.0%	1.0%	0.6%
# of Total Searches	13,990	12,219	1,378	14	3	301	75
% of Total Searches	100.0%	87.3%	9.8%	0.1%	0.0%	2.2%	0.5%
# of Citation/arrests	142,261	131,533	7,423	436	58	1791	1,020
# of Contraband Hits	6,492	5764	594	8	2	91	33
Benchmark	-----	95.10%	2.65%	0.54%	0.18%	0.68%	0.85%
Calculations							
Stop Disparity Index	-----	0.99	1.62	0.55	0.00	1.47	0.71
Stop Disparity Ratio	-----	-----	1.64	0.56	0.00	1.48	0.72
Search Rate	4.64	4.32	10.64	1.57	2.48	10.24	4.00
Search Disparity Index	-----	0.93	2.28	0.33	0.00	2.20	0.83
Search Disparity Ratio	-----	-----	2.45	0.35	0.00	2.37	0.89
Citation/arrest Rate	47.19	46.52	57.34	49.04	47.93	60.92	54.43
Contraband Hit Rate	46.40	47.17	43.11	57.14	66.67	30.23	44.00

County Level Traffic Stop Results

The 301,479 accepted traffic stops of WV registered vehicles were further analyzed by county of stop. All stops reported within a given county were combined, regardless of reporting agency, and compared to county level population benchmarks. Key disparity indicators as presented above were calculated for each county and are shown in the [Key Disparity Indicators by County of Stop](#) table. To further illustrate the distribution of disparity ratios by county, two state maps are presented below showing the nonwhite to white stop and search disparity ratios. For this analysis all race groups other than white were combined into a “nonwhite” category. Thus, a single ratio could be used to examine disparity in stops and searches between white and nonwhite populations. Consideration should be given to the total number of stops reported and the population distribution within a county when interpreting these results.

County Level Stop Disparity Ratios
Nonwhite - White



These results are followed by a presentation of key disparity indicators. Similar to the analyses above, these findings are divided by type of police agency and by stops and searches ([see Key Disparity Indicators for State Police Detachments](#) and [Key Disparity Indicators for City/County Agencies](#)). The results from the sub-area analysis of patrol areas are also presented ([see Sub-area Analysis of Selected Principal City and County Law Enforcement Agencies](#)).

To assist in making inter-agency comparisons, results from the key disparity indicators analysis are also summarized for traffic stops and searches. These inter-agency comparisons are presented in the *appendices* section of the report ([see Stop Disparity Indices and Ratios for State Police Detachments](#) and [Stop Disparity Indices and Ratios for City/County Agencies](#)) and searches ([Search Disparity Indices and Ratios for State Police Detachments](#) and [Search Disparity Indices and Ratios for City/County Agencies](#)).

¹ Many law enforcement agencies, working closely with analysts, develop rigorous strategies to monitor and audit the collection and submission of traffic stop forms. These strategies can involve a system of internal agency monitoring to resolve errors and identify erroneous information prior to submission as well as efforts to compare submissions to other data systems. These may include: matching motor vehicle stop forms to official citation records, assigning supervisors to review MVSFs for completeness and accuracy after each shift, and cross-checking MVSFs with other official sources of data such as computer aided dispatch records.

² Population figures based on Census estimates is one of the most frequently used type of data to determine expected probabilities of police stops. However, research has pointed to a number of limitations inherent in the use of Census data. Two of the most commonly cited limitations pertain to the use of residential populations to estimate driving populations and the inability of residential data to account for driving behavior. For instance, several studies have shown that the residential populations may not accurately reflect the driving populations of communities. In addition, Census data does not take into account driving behavior which further influences the probability of being stopped by law enforcement. While the present analysis tries to compensate for the possible disjuncture between the residential and driving populations by adjusting for vehicle ownership, it is not able to account for driving behavior.

³ While reported traffic stops for each municipal agency were compared to the adjusted city population in which they were stationed, it was not possible to limit the traffic stops to only those within an agency's jurisdiction. This is because an agency's jurisdiction may include multiple counties.

⁴ It is important to note, however, that in the sub-area analysis tables the stop totals by patrol area may not add to total stops by the agency due to invalid patrol area information. Stops with a patrol area number/code other than those designated by the agency were removed. In addition, designated patrol areas were collapsed for some agencies to better match Census boundaries and thus allow for a more accurate benchmark.

⁵ Researchers often note the importance of separating reactive versus proactive traffic stops in "stop analysis". That is, to make a distinction between stops with differing levels of discretion on the part of law enforcement. Given the scope of this project, however, it was not feasible to separate the different "reasons for stop" in the analysis. Hence, all traffic stops reported by each agency and subsequently accepted for analysis are contained in the key indicator tables.

⁶ It is important to note that all of the indices and ratios presented are sensitive to small numbers and can become unstable. Results based on small numbers of traffic stops are less reliable than those with larger numbers of stops. That is, because many of the agencies examined in this report submitted a small number of traffic stops and searches, the results may or may not be reliable and/or generalizable. It is for this reason that agencies with fewer than 50 total traffic stops were excluded from analysis. Thus, it is important to exercise caution when interpreting the results of individual agencies when small numbers are reported.

⁷ The racial group “White” is comprised of all white, non-Hispanic drivers. The “Other” category includes Middle Eastern drivers.