# VISUALIZING NEW ENGLAND POLICING DATA: AN INVESTIGATION INTO IMPLICIT RACIAL BIAS AND POLICE DATA MANAGEMENT

An Honors Thesis Presented

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## ABSTRACT

From controversial stop-and-frisk practices to the use of force that sparked the Black Lives Matter movement, police behavior and strategy have long been the subject of accusations of systemic racial bias in the United States. As civil unrest builds around police behavior, the lack of transparency in policing has become apparent to the American public. Policing data in the United States suffers from two problems. First, the requirements for the collection of demographic data vary from department to department. Second, in most states, the available crime data is difficult for the public to find and, when accessed, equally difficult to interpret. In this project, I use existing data from New Hampshire police departments of differing sizes to build a tool for visualizing police data. The end product provides police departments and the general public with a resource to visualize and interpret the demographic data that these agencies track. In the future, these tools can be used to hold law enforcement agencies accountable to the people whom they serve and ensure that policing of individuals is proportional to the population of the area. This project can also be used as a public source of information on where and how the law is being enforced.

# 1. Introduction and Research Questions

The primary research goal of this project is to build a data visualization tool with the purpose of aiding police departments and the public in assessing and understanding policing bias at the local level. I use visualization techniques from software development to design an application that allows for easy interpretation of demographic data of a single police department in the context of the geographic area. This tool is a prototype for further directions of law enforcement agencies to better communicate the data that they collect on biased policing. When integrated into a website, it can be used to inform the public about the individuals being arrested and otherwise identified by the police by putting police data in context with the demographics of the area. In my preliminary research to prepare for this project, I explore the needs of these institutions and understand what is already being done to address bias. I also research the quality and methods for collecting policing data in order to make recommendations for future directions in this area.

## Sub-Questions

Before conducting an investigation on police data collection and accessibility, it is important to understand the broader scope of why this research needs to be done. I answer this question in my review of the existing literature relevant to biased policing in the United States. In doing so, I explore the historical connection between instances of bias, institutional bias and larger systems of discrimination. This will provide me with context as I begin to develop my application and understand potential methods for reform of demographic policing data. People involved in enforcing and writing the law, as well as criminal justice scholars, have a vested interest in this question, as well as potential users of my end product.

When confronting bias at the individual level, police stations and other institutions in positions of power in law enforcement often cite a lack of resources to evaluate their interactions with the public and policing methods (Graham, 2020; Hershberger, 2020). As a part of my application development, I first become familiar with the technologies that these groups are already using, in order to accurately assess their need. This work leads me to answering the research question: What methods and tools (or lack thereof) are law enforcement using to assess bias in their interactions with historically marginalized groups? My audience for this question is people in positions of power in law enforcement including police chiefs, politicians, and administrators. As the national conversation on racial justice and police reform continues, the demand for law enforcement transparency has become stronger and more urgent. In answering this question, I speak with people involved in law enforcement data individually to assess what kind of evaluation has already been done, and what could be improved upon.

Lastly, I want to understand what data are available to the average person interested in biased policing in their area. This will lead me to answer the research question: What information on instances of biased policing is currently available to and interpretable by the public? Answering this question will provide an evaluation of the existing sources of information and help me understand their shortcomings. A broad understanding of the state of police data is necessary in order to recommend how they can be improved and include these improvements in my final product.

## 2. Literature Review

I use literature on the topic of implicit bias and the practice of policing as sources of information, rather than an object of study. By conducting a literature review of the work done on cognitive bias and policing, I can understand the larger stakes of police data collection,

transparency, and accuracy while gaining important context for my project. Learning about the broader scale of the harm that policing bias does is an important aspect of combatting and understanding why data transparency in policing is relevant to changing the system at large.

The United States has the highest prison population in the world. While the country makes up only 5% of the global population, it is responsible for nearly one quarter of its prison population (*Mass Incarceration*, n.d.). There are more men and women awaiting trial and yet to be found guilty than those serving a sentence. The national mass incarceration problem is tied to over-policing and biased policing, particularly in areas where people cannot afford to make high bail. Scholars from various fields have accumulated a large body of work cataloging exactly how this system came to be, where it exists, and who it affects. I establish context for research on biased policing by learning from past policing strategies and reviewing the existing literature on racial bias in the individual, police practices, and data transparency in the justice system.

## The History of Policing

Much of the scholarly work on policing began in the 1970s and 1980s, during the beginning of what scholars refer to as the problem-solving era of policing. Kelling and Moore's 1988 paper titled *The Evolving Strategy of Policing* established the historical context of policing for many modern researchers. The authors separate the United States' varied history of law enforcement into three eras: the political era (1840s – early 1900s), the reform era (1930s – 1970s), and the community era (starting in the late 1980s, at the time of publication). The authors detail how police authorization, function, organizational design, relationship to the public, and methodology have shown gradual change over time as a result of both internal and external forces (Kelling & Moore, 1988).

In the first era, police were closely connected to the social and political feelings of the community. Police departments were small-scale and decentralized in structure. Members of the police force were often community members themselves and held citizen satisfaction in high regard. The police identified with the local population so strongly that it often resulted in discrimination against outsiders who violated the community's social norms, especially members of minority ethnic and racial groups.

The second era, referred to as the reform era, was born out of progressive dissatisfaction with the police's political ties. The organizational strategy shifted to a more centralized system, and police primarily focused on crime control rather than community wellbeing and satisfaction. Police began using vehicles to patrol neighborhoods and introduced 911 systems and computer-aided dispatch systems to promote efficiency and rapid response techniques. The introduction of these tools aided in creating the "professional distance" between police and their environment. The reform strategy began to run into problems in the 60s and 70s, as both crime and fear rose rapidly, though seemingly independent of one another (Kelling & Moore, 1988).

Kelling and Moore conclude their article by focusing on police organizational strategy as a roadblock for any significant change. The authors distinguish between policing strategies that fundamentally change the methodology of police actions and mere tactics that continue to "deliver police services" in accordance with the system's agenda. Experiments with team policing in the 60s and 70s, for example, had consequential effects for other aspects of policing, since tactical decisions were made at lower levels of the organization, while a tactic like foot patrol does not change the broader strategy of the organization (Kelling & Moore, 1988). The authors argue that the practices of policing must evolve continuously in accordance with the public's needs.

## A Look into Bias in the Individual

Critics of police reform will dispute claims of systemic, continued bias by invoking the "few bad apples" argument. The argument suggests that police violence against Black and brown people results from the actions of a small number of police officers with racial biases. It explains that by eliminating these individuals from positions of power, police misconduct can be remedied on  a national scale (Marcus, n.d.).

The literature reflects little evidence to support this theory and verify the difference between "good cops" and "bad apples." Few scholarly sources investigate police behavior and complaint history on the department and community level at all. Instead, as researcher Gregory Squires at George Washington University notes, some scholars attribute the shroud of secrecy around this topic to the "blue code of silence," in which officers informally agree not to report their colleagues' misconduct (Squires & Austin, 2020).

To understand bias at the individual officer level, we can learn from psychological research on implicit bias and association. A popular measure for biases in the individual is the Implicit Association Test (IAT). Respondents are given a visual representation of a group and a trait and asked to sort them in a specific manner. Their response speed is then measured and interpreted by a computer (Anthony G. et al., 1998). Famous IATs include race attitude, which asked participants to match African American first names and faces with good attributes and European American first names and faces with bad traits, and then again with the characteristics reversed. A score that demonstrates faster response times with one pairing than with the other suggests an implicit association bias in the participant. In an ongoing web-based study starting in 1998, Nosek et al. collected 600,000 voluntary IAT results from site visitors, along with their

self-reported demographic details. The responses from the study show, on average, an implicit preference for European American names and faces (Nosek et al., 2002).

The Implicit Association Test has taken on other forms to examine biases in different contexts. Notably, the Guilty/Not Guilty IAT by Levinson et al. was performed to address unintentional and covert racial discrimination in the legal system. The study mimicked jury members' thought processes during a trial by asking its participants to first complete an evidence evaluation task. Next, they completed a series of other tasks in a randomized order. These included two IATs: the (Black/White) Guilty/Not Guilty attribute measure and the (Black/White) Pleasant/Unpleasant attribute measure. Participants also completed the Modern Racism Scale, which measures self-reported racial beliefs. In their findings, they found that participants did hold implicit associations between Black and Guilty. However, the two IATs measured did not show a correlation, suggesting that the Guilty/Not Guilty measure does demonstrate a different construct. In their investigation of self-reported bias, they found implicit attitudes of race to be quite different, if not opposite, of the participant's self-reported attitudes (Levinson et al., n.d.). A central theme from this study is the notion of self-reported biases and measured biases as two different metrics.

## Police Practices

The literature on police activities and practices is somewhat sparse. Often, scholarly studies focus on a particular policing method and its effectiveness or outcome, rather than police activities as a whole. One widely cited article titled "What is Known About the Effectiveness of Police Practices in Reducing Crime and Disorder?" and published by Telep & Weisburd in 2012 builds on assessments of police effectiveness in reducing and preventing crime. The authors recommend further directions for police activities by citing historical outcomes of policing

methods while also evaluating current strategies. Their investigation of current police activity relies primarily on data from 2007 collected by the Law Enforcement Management and Administrative Statistics (LEMAS) survey conducted by the Bureau of Justice Statistics (*Bureau of Justice Statistics (BJS) - LEMAS*, n.d.). The study showed that police practices, including training methodology, patrolling methods, and tools, vary widely between departments of different sizes. More than half of large departments provide training on community policing, though the details of the training curriculum are unclear. Large departments were also shown to be more likely to engage in problem-oriented policing. The study revealed a discrepancy between large and small departments in their use of technology, with 90-100% of large agencies using computers for hot spot identification, crime analysis, and mapping. Smaller agencies, however, continue to fall behind in this category. The authors cite numerous studies supporting hot spot identification effectiveness, including the popular Broken Windows Theory (Wilson, 1982). They recommend geographic crime data be accessible to officers in patrol cars while on duty to promote more effective policing (Telep & Weisburd, 2012).

A more recent study by Amie Schuck at the University of Illinois at Chicago offered an argument against the effectiveness of this practice. Titled “Examining the Community Consequences of Arrests for low-level Criminal Activity,” the paper focused on community-police relations where Broken Windows policing is practiced. The author hypothesized that higher arrest rates for low-level criminal activity (defined to include possession of marijuana, prostitution, disorderly conduct, and miscellaneous offenses) will be associated with “less police legitimacy, less willingness to partner with the police, and less capacity for informal social control in the neighborhood” (Schuck, 2020, p.). The study made use of Chicago Police Department arrest data and original surveys of random samples of residents. Low-level arrests

were identified as the independent variable being measured, while dependent variables included police legitimacy, work with police, and informal social control. The model controlled for several variables, most notably racially biased policing and crime rate. Multilevel mixed-effects modeling was used to obtain results consistent with the hypothesis that arrests for low-level criminal activity do reduce the community's capacity to engage in informal social control. However, the study's results did not show a negative relationship between low-level arrests and police legitimacy or residents' willingness to engage with the police. The author concludes by emphasizing the harmful effects that low-level arrests can have as a means of preventing serious crime and violence. If a community's systems of social control are undermined, they warn, these methods could make communities less safe in the long term.

## Data in the Criminal Justice System

Telep & Weisburd note the lack of available data on the activities that police departments engage in day-to-day. The large national survey LEMAS limits the number of questions that can be asked about the daily practices of police. The LEMAS data only reflect responses from specific individuals in the department and not the department's activity as a whole (Telep & Weisburd, 2012). In Schuck's quantitative study, the author obtained arrest data from the Chicago Police Department's open data portal system to reveal the raw number of low-level arrests. Still, this does not provide information on police-civilian interactions that do not result in arrest (Schuck, 2020). Telep & Weisburd note that more work needs to be done in this field in order to draw conclusions from the data on a smaller scale.

## Conclusions from the Literature

The existing scholarly research on police strategy and methods is quite extensive. For years, scholars have been interested in police activities as they relate to order and disorder in a

given geographic area. Increasingly, the field has seen researchers examine how police presence affects a single community's attitudes and ability to maintain social order. To learn about the biases in law enforcement, we turn to the topic of implicit bias as explored by researchers in psychology. The literature shows that an individual can express bias on their own, in small, split-second decisions that they make. Individual biases can behave differently from one another, based on the situational contexts and the parties involved. A key conclusion from these readings is that individual biases exist in a large portion of the population, regardless of the person's self-reported beliefs and perceptions. The literature on policing across academic disciplines shows that a lack of available data keeps research on everyday law enforcement activities from progressing on a larger scale. By establishing that individual biases do exist in the average person, I can begin to address the shortcomings of police data as it relates to biases in law enforcement officials.

# 3. Methodology

## Interviews

In my study of the methods and policies of police data collection, I approach the topic from several different viewpoints. As a primary source for my study of policing data, I conduct a series of informal interviews with police department officers and administrators in New Hampshire. These interviews intend to help me answer the research question: What tools (or lack thereof) are law enforcement using to assess bias in their interactions with historically marginalized groups? This method will provide me with guidance for examining demographic policing data for later use in my project to assess and visualize interactions between police and people in marginalized groups. It will also help me understand how the data is stored from an

administrative perspective. Gaining a knowledge of how the data is stored and collected will help me understand the significance behind any numbers and figures used in my project. Due to the COVID-19 pandemic and geographic limitations, these interviews are conducted over the phone and using video conferencing platforms.

The decision to focus on New Hampshire was made to allow for a focus on how race, gender, and ethnicity are tracked in police encounters in a predominantly white state, where racism is commonly dismissed as not a problem or not applicable (Graham, 2020). A significant 89.8% of New Hampshire's population identifies as white and non-Hispanic, according to the U.S. Census conducted in 2010. Relative to its population, New Hampshire has the fourth highest white and non-Hispanic population in the United States, behind its neighboring states Vermont and Maine, as well as West Virginia (U.S. Census Bureau, 2021). By narrowing the scope of this project to one state, I can ensure that all police departments used in this study are operating under the same state- and national-level requirements for police data reporting and collection. To ensure the breadth of my sample, I focus on three police departments of differing sizes. The selection of police departments used in the study was partially dependent on the point of contact staff member's time and willingness to participate in an interview.

In this project, the Hollis Police Department in Hollis, New Hampshire serves as the small-size case study. My interview subject was Hollis Chief of Police Joseph Hoebeke, who has been at the Hollis Police Department for five years. Located in southern New Hampshire, the town of Hollis has a population of 7,684, according to the 2010 United States Census. Population projections generated from periodic sampling indicate that the population has had a slight upward trend in the last ten years. Demographically, the 2010 census indicates that the town is 91.6% white alone, 0.8% Black or African American alone, and 2.3% Asian alone, with 4.5% of

the population identifying as two or more races. 2.1% of Hollis's population identifies as Hispanic or Latino. In the larger context of the state, Hollis has a higher percentage of people identifying as White and non-Hispanic than the state as a whole by 1.4% (U.S. Census Bureau, 2021). Geographically, the town of Hollis is located near the larger and more diverse city of Nashua, NH, and shares several roadways with towns on the northern border of Massachusetts. It is important to note that that while the Hollis Police Department operates in the town of Hollis, their activity frequently includes interactions with visitors and residents from these neighboring areas. The Hollis Police Department maintains a staff of 21 officers, making it one of the smallest departments in the state, and a good candidate for our small-size case (*CALEA Client Database,* 2021).

For the mid-size case, I worked with the municipal police department located in Keene, New Hampshire. My interview subject was Lieutenant Shane Maxfield, who is in charge of special services for the department. For the small city of Keene, NH, the 2010 U.S. Census data indicates an overall population of 23,409, with more current estimates trending slightly downward to 22,786 in July of 2019. Notably, the population of Keene includes the student population of Keene State College, a small public university of about 3,500 students (*Keene State College,* 2021). According to the most recent U.S. Census data, the demographics of Keene, NH indicate that it is predominantly white, with 92.7% of the population indicating that they identify as white, and 91.0% identifying as both white and non-Hispanic. This report also shows that Keene's population is 1.8% Black or African American alone and 2.5% Asian alone, with 2.7% identifying with two or more races and 2.7% identifying as Hispanic or Latino. Again, Keene's white and non-Hispanic percentage of the population is higher than the state-wide metric (U.S. Census Bureau, 2021). Geographically, Keene is located in western New

Hampshire, close to the border with Vermont. Keene is a point of convergence for several state highways, leading to the nearby towns of Brattleboro, Vermont and northwestern Massachusetts, as well as more distant cities including the state capital of Concord, New Hampshire. The Keene Police Department has a staff of 58 people (*CALEA Client Database*, 2021) and 40 sworn officers as of the year 2020, all of whom are white (Keene Police Department, 2020). These numbers put the Keene Police Department solidly in the mid-size range among New Hampshire police departments. With the added complexity of interactions with the student population and visitors from nearby states and towns, this makes Keene an interesting choice for our mid-size case study.

For our large police department case, I worked with the Nashua Police Department in Nashua, New Hampshire. In my interviews, I spoke with Accreditation Manager Bill Pease and Crime Analyst Jenny Sousa, both employees of the Nashua Police Department. The 2010 U.S. Census reported that Nashua is one of the more diverse cities in New Hampshire, still with 82.6% of the population identifying as white alone, and 73.2% as white and non-Hispanic. These numbers indicate that Nashua is home to a larger percentage of minority-identifying people than the state of New Hampshire as a whole. The Census report indicates that 4.1% of Nashua's population identifies as Black or African American alone, and 8.4% as Asian alone, with 3.2% of the population identifying with two or more races and 12.7% identifying as Hispanic or Latino (U.S. Census Bureau, 2021). Nashua is one of New Hampshire's largest cities, with many commuters going to and from the cities of Manchester, New Hampshire and Boston, Massachusetts. The Nashua Police Department has a staff size of 241 to account for the large population that it serves, making it one of the largest police departments in the state and a good example for our large-size case (*CALEA Client Database*, 2021).

The particular subjects I worked with was largely dependent on the given police department's organizational structure and who was available to give me their time. At larger police departments, for example, the department may have a crime analyst on staff, whose primary role is to work with and analyze police data. Other police departments may have another individual specifically hired to handle issues of accreditation and public affairs. Smaller departments may offload these tasks to administrative personnel and perform less extensive, time-consuming analysis of their crime data. In my interviews, I ask about the procedure for collecting and processing demographic data of the people with which the police interact. I also investigate the policies and requirements in place for reporting data to larger institutions and to the public.

These interviews give me reliable and realistic accounts of how police data gets collected, processed, and reported. They also reveal the standards to which this data methodology is held. By conducting interviews with three different police departments, I gain an understanding of the ways in which police departments of various sizes can adhere to the same state-level standards, and the efforts (or lack thereof) they make to anticipate and address their responsibility of mitigating racially biased policing.

## Online Presence and Accessibility

In my case studies of three police departments, I evaluate the online presence of each department in order to understand what data on biased policing are currently available to the average person, and how easy this information is to find and interpret. This survey of existing resources reveals what discrepancies and gaps exist in communicating the activities of police to the public. As a member of the public, I can evaluate the effectiveness of the charts and visualizations provided. I can also speak to the ease of accessibility of these data. In the

development of my prototype application, this knowledge is crucial for addressing and improving upon the effectiveness of these tools.

## Technical Resources

In the development of my application, I use the coding language Python and the data processing and visualization libraries Pandas and Plotly. These tools aid my research goal of creating a prototype application to visualize the available police demographic data, for potential use as part of a larger police department or state website. My investigation involves reading the documentation for these libraries and evaluating existing tools that achieve a similar function. The end product is achieved by cleaning and displaying existing data from a data source provided by a publicly available law enforcement database or report.

I output the data in a cohesive, understandable way using software engineering and data visualization design principles. To integrate this project into an existing police website, a staff member with some engineering skills would need to set up the tool to pull from the relevant records and make it available as part of the existing police website. Then, visitors to the website would have the ability to use the tool to filter and engage with the data to gain a better understanding of the state of biased policing in their area. When using data from a single office or location, this tool makes bias apparent and clear to the user, and if made available on a public website, can be used to hold local police accountable to the average citizen.

## Challenges and Topics Left for Further Investigation

The units of analysis in my research are the data collection training and standards, as well as the instances of discrimination and oppression by law enforcement officers themselves. One potential gap in this research is the absence of stories from the other side of law enforcement bias: the victims. Since this work mainly focuses on finding concrete ways in which people in

positions of power in the justice system can be aware and understand power imbalances in their interactions, I chose to forego investigation into this particular topic.

## 4. Results

The results of this study are two-fold. First, I explain the effectiveness and accuracy of data pertaining to biased police activity, as described in interviews with police department staff and in official reports written by the departments used in this study. I explain the nuances of police data by describing the manner in which it is reported and collected, and the ways in which these methods vary by agency. In my analysis, I offer suggestions for reforming and improving demographic data collection in policing. Next, I evaluate the clarity and effectiveness of this data as it relates to public accessibility and transparency. I do so by examining the data displayed to the public on the websites of the three police departments used in this case study. I use this information to make recommendations for more effective ways to interpret and display demographic police data to the public. These recommendations are the basis for my prototype application, which uses data collected by police and displayed on a publicly available police department website.

### Police Data Reporting

All three of the police departments used in this study are CALEA accredited. The Commission on Accreditation for Law Enforcement Agencies (abbreviated as CALEA) establishes a uniform standard for law enforcement agencies in their data collection and reporting. CALEA is an international organization and was established with the mission of, among other goals, ensuring accountability within law enforcement agencies and increasing community advocacy in policing. CALEA standards require that accredited police departments

perform annual compliance reviews, and generate a full compliance review every four years to ensure reaccreditation (*The Commission on Accreditation for Law Enforcement Agencies, Inc.*, 2021). These reviews include detailed demographic statistics of arrests, motor vehicle stops, and field contacts. I found that while all police departments must generate this report in order to maintain their accreditation, it is not mandatory to make the report available to the public. The manner in which these statistics are categorized varies in definition and scope depending on the department, as I will explore further in my investigation of police data collection.

It is important to note that, though all the police departments worked with in this study are CALEA accredited, only 13 municipal law enforcement agencies in New Hampshire have received full accreditation as of 2021, with 5 additional agencies in the self-assessment phase of accreditation (*CALEA Client Database*, 2021). Since our selection of police departments to work with for this study was dependent on the availability and willingness of the staff, this is clearly not a representative sample of all New Hampshire police departments, and merely a case study of three agencies of differing sizes. It is not unreasonable to speculate that a police department's history of compliance with these data reporting standards may make an agency more likely to participate in a research project related to data and bias in the justice system.

## Police Data Collection

The demographic data relevant to our study of biased policing is collected and categorized in a variety of ways. The methods of categorizing each interaction do not vary substantially among the three police departments used in this study. Still, some practices did vary among departments. In my analysis and summary of the methodology and collection of demographic policing data, I focus on data taken in three cases: arrests, motor vehicle stops, and field stops. In my report, I provide a working definition for each of these three categories and

describe the ways in which they are collected and reported by each department studied. In all three departments used in this study, each police department collected demographic information as it pertained to gender, race, and ethnicity. In the event that a police department was recording demographic data for an interaction, these were the three categories used.

First is arrest data, which is defined by all three departments as demographic data collected as a result of an interaction resulting in arrest. Arrest demographic data was collected at all three police departments used in this study. Typical procedure for arrest data is to directly ask the individual about their race, gender, and ethnicity, along with more specific identifying information including home address and full name, when an arrest record is made. Here, the demographic data is generated based on the response of the individual in question, and thus there is very little room for error. However, only looking at arrest data does not provide an accurate picture of all police activity and interactions with the public, since not every interaction with the public results in an arrest. Therefore, it is necessary to look at other pieces of data to gain a more well-rounded perspective of police activity, and to make an assumption of any kind of bias.

Next, there is data gathered from motor vehicle stops. Motor vehicle stops, also named "traffic investigatory stops" in some reports, are defined as traffic stops where there is probable cause for arrest or warning, as determined by the officer on duty. While interactions that result in arrest fall into the "arrest" data category described previously, traffic stops that do not result in arrest, but instead result in a warning or citation, are handled differently. The definition of the category varies in each department report, with our mid-size case reporting "traffic warnings and citations" data, while our small-size case reports all traffic investigatory stops, as previously described. To be compliant with CALEA standards, police departments must collect demographic information of the people with whom they interact during these encounters in some

fashion. However, police officers are not required or expected to directly ask a person's race and ethnicity. At least one CALEA report on bias-based policing recommended against directly asking individuals their gender, race, and ethnicity. The officers interviewed for this study agreed with this sentiment. Instead, for these cases, police officers use their observations to make an assumption about the individual's race and ethnicity. If the officer does not feel that they have enough information, or are not comfortable making a decision, the stop is still reported, but the race and ethnicity field is marked as "unknown". This is problematic for a number of reasons and has significant implications for interpreting police data.

From my investigation of police departments of several different sizes, I have found that each department prioritizes this data collection differently. Our small-size department case study has made a significant effort to decrease traffic stop encounters where an officer did not record any demographic data after a traffic stop encounter. In the year 2018, the department failed to capture gender, race and ethnicity data in 254 instances out of 6376 stops (3.9% of cases). This metric was similar in 2019, with the department failing to capture any demographic data in 160 instances out of 4321 (3.7% of cases). In their annual CALEA report on bias-based policing, the Hollis Police Department cites an error in their reporting software, in which some traffic stops were counted twice, as a factor in why this metric has been high in years prior. To account for this, we can examine the data in which at least one category was recorded, and an officer reported an "unknown" value for one or both of the remaining two demographic categories. In these cases, for the year 2019, police officers failed to record one or both of an individual's race and ethnicity for 106 stops out of 4321 (2.45% of cases). For the year 2020, officers failed to capture either race or ethnicity, or both, in 95 instances out of 3133 total stops (3.03% of cases). It should be noted that this year had significantly less motor vehicle stops, likely as a result of the

pandemic, but the percentage value increased nonetheless. After hand reviewing their demographic data for the year 2020, the report also noted 10 cases where gender, race, and ethnicity were not recorded at all. These numbers are separate from the unknown values above, since no data was collected whatsoever. The department attributes this small group of cases to a scenario when an officer "dispelled their reason to stop a motorist immediately" and released the operator before they could be identified at all (Maloney, James, 2020).

In my interviews with our mid-size and large-size case study experts, they described a similar problem with unknown fields in their report of traffic warnings and citations. The most recent CALEA report from the Keene Police Department indicates missing values for race and ethnicity in 293 stops of 5406 (5.42% of traffic warnings and citations) from the year 2016, 90 of 5684 stops (1.58%) in 2017, and 478 of 4596 total stops (10.4%) in 2018. Data from the year 2019 is somewhat incomplete, since the data was compiled for the report mid-year, but the totals from January 1, 2019 to August 31, 2019 indicate failure to capture race and ethnicity in 456 cases of 2861 total warnings and citations, for a significant rise to 15.94% (Keene Police Department, 2020). Totals posted on the Keene Police Department website, but not yet reflected in a CALEA report, which is issued every four years, indicate 929 stops in which race was marked as "unknown" of 2955 total motor vehicle citations and warnings, amounting to 31.44% of all interactions recorded (*Police Department | City of Keene*, 2021). Clearly, the issue of incomplete race and ethnicity data has not been mitigated in the past few years and has been a consistent problem when reading and interpreting police data in the city of Keene.

The substantially larger city of Nashua, New Hampshire also records motor vehicle warnings and citations, rather than all traffic stops. The data they provided from the year 2020 indicates that an individual's race was marked as unknown in 2,885 cases out of 12,434 warnings

and citations issued, amounting to 23.2% of all cases. These numbers can be broken down further to 22.53% of women and 23.57% of men where race was not recorded. In my interview with the accreditation expert at the Nashua Police Department, the retired officer explained that police officers were not pressured to record demographic statistics if they felt at all unsure of the race or ethnicity of the individual in question.

The third category of police interactions had less consistency across departments and showed similar problems to data collected during motor vehicle stops. The Keene, NH preliminary CALEA report numbers for the year 2020 have a category for "subject stops", which are defined in the report as "contacts made in the field for suspicious activity and suspicious vehicles" (Keene Police Department, 2020). The Hollis, NH report referred to this category as "field contacts" defined as when police "have contact with a person in the field who is not arrested but who is suspicious in nature," but noted that a majority of these contacts are initiated at traffic stops for impaired driving where probable cause for arrest or citation is not met (Maloney, James, 2020). The Nashua Police Department did not include a third field in the data they provided me with. Both Keene and Hollis included miscellaneous other categories in their reports that were not seen in other reports, including consent searches, civilian complaints, hiring changes and the demographics of the officers.

## Implications and Recommendations for Police-Collected Data

As noted in the discussion of motor vehicle stop records, police departments across the board have significant problems with accurately logging demographic data of individuals involved in these interactions. In my interviews with police staff and administrators, my subjects described several reasons for this discrepancy. First, there is a group of cases for which the police officer initiated a motor vehicle stop, dismissed the initial reason for the stop, and let the

individual proceed before any demographic information could be collected. In these cases, as my interview subjects suggested, it is not reasonable to require any data collection.

There exist other groups of interactions where these discrepancies cannot be as easily dismissed. In all departments studied, one can observe that some motor vehicle interactions have been logged with at least one field missing. This indicates that an officer did perform a stop, but either failed to record or could not determine the individual's race and/or ethnicity. When drawing conclusions from this demographic data, these gaps become extremely important for studying the issue of biased policing at the department level. When police departments do not provide access to clear and accurate demographic data, it impacts researchers and the public's ability to learn and interpret the data.

A few methods have been suggested for improving this problem. In the wake of the killing of George Floyd in Minneapolis, Minnesota in the spring of 2020, and the nationwide protests against police violence that followed, New Hampshire Governor Christopher Sununu issued an executive order establishing LEACT (the New Hampshire Commission on Law Enforcement Accountability, Community, and Transparency). Made up of politicians, legal officials, law enforcement leadership, racial justice activists, and community leaders, the group was founded with the intention of developing "recommendations for reforms that the Commission deems necessary to enhance transparency, accountability, and community relations in law enforcement." Their specific subjects of investigation included the training curriculum, procedures, and policies developed by state and local police departments, the reporting and procedures regarding police misconduct, the state of the relationship between the police and the community, and other subjects related enhancing transparency, accountability, and community relations in law enforcement (NH Exec. Order No. 11, 2020).

Since the group's creation, members of the LEACT group have acknowledged the significantly lacking demographic data collected by police officers at motor vehicle stops. One potential solution for this problem proposed by the group is to include race and ethnicity data on the New Hampshire driver's license. With this addition, the police officer would not have to make an assumption based on their observations in the moment of an individual's race and ethnicity. Instead, this demographic data would be collected directly as reported by the individual on their driver's license and logged into the software that police use to identify the driver using their license. This reform was studied and unanimously recommended by the LEACT group. As a result, the proposal was included in Senate Bill 96, a bill that also allocates state funding for police departments to purchase body and vehicle cameras, among other proposals recommended by the LEACT group. In interviews with the press, the bill's proponents have described the demographic data as it exists now as allowing some to perpetuate a false narrative that racism in policing does not exist in New Hampshire, and to dismiss personal accounts as isolated incidents. In March of 2021, New Hampshire Senate Republicans voted to remove the measure that would add racial demographic data to all New Hampshire drivers' licenses, citing privacy concerns (LaCasse, 2021).

## Police Data Accessibility

The second part of my study focuses on the availability and accessibility of police data to the public. For each department in my case study, this process involved assessing the resources, or lack thereof, that are publicly displayed on the police department website. In my assessment, I evaluate the clarity and effectiveness of the data available to the public on the police department website for each of the three departments worked with for this study. Of the three police departments involved in the study, only one department (our mid-size case located in Keene,

New Hampshire) displayed aggregate demographic data of the people with whom their officers interacted. While the other two departments (in Hollis and Nashua, New Hampshire) did provide prompts and contact information for requesting information or data from the department, they do not provide a report on the demographic data that they collect without a request. It is important to note here that under the New Hampshire Right to Know Law R.S.A. Ch. 91-A et seq., citizens and representatives of the media have the ability to request public records, provided that they exist and are relatively easy for the police department to obtain. Though the average person has a legal right to see and understand the demographic data that is collected by police departments, this extra step provides another barrier between the public and demographic data of who is being identified by the police. This contributes to the narrative that racist, biased policing does not happen in this area, if the police departments do not appear to be addressing it beyond remedying isolated incidents. By informing the public and providing them with easy to understand, transparent data, police departments can be held accountable for trends in the demographics of the people they police.

Our mid-size case, the Keene Police Department, indicates on their website that they began publicly displaying the demographic data they collect in March 2021. On their website, the department states they plan to post data annually from the previous calendar year by the middle February each year. The demographic data is relatively easy to find from the homepage. On the page, they provide links to three PDFs featuring demographic data for motor vehicle stops, arrests, and subject stops, respectively. Each PDF displays a table of the data collected, as shown in Figure 1 below. The tables feature the raw data and totals, along with a percent value of the total for each race and gender category. I will further discuss these methods of displaying the

data in my recommendation, but for now I simply note that these PDFs do serve their purpose of communicating the demographic data to the viewer.

**2020 Keene Police Department Motor Vehicle Stops (MVS) Demographic information**

**Total Citations- 557** 557
**Total Warnings- 2398** 2398
**Total Motor Vehicle Stops (MVS)** 2,955

| Race | Gender | Citations | Warnings | Total | Percentage Citations | % of Total MVS |
|---|---|---|---|---|---|---|
| White | Male | 268 | 878 | 1146 | 23.38% | 38.78% |
| White | Female | 146 | 666 | 812 | 17.98% | 27.48% |
| | Race Total | 414 | 1544 | 1958 | 24.14% | 66.26% |
| Black or African American | Male | 4 | 26 | 30 | 13.33% | 1.02% |
| Black or African American | Female | 1 | 8 | 9 | 11.11% | 0.30% |
| | Race Total | 5 | 34 | 39 | 12.82% | 1.32% |
| Asian | Male | 3 | 12 | 15 | 20.00% | 0.51% |
| Asian | Female | 2 | 7 | 9 | 22.22% | 0.30% |
| | Race Total | 5 | 19 | 24 | 20.83% | 0.81% |
| Unknown | Male | 83 | 441 | 524 | 15.84% | 17.73% |
| Unknown | Female | 50 | 355 | 405 | 12.35% | 13.70% |
| | Race Total | 133 | 796 | 929 | 14.32% | 31.44% |

Figure 1: Demographic data as displayed on the Keene Police Department Website

## Prototype Application and Recommendations for Improved Accessibility

Of the three police departments studied, only one department proactively displayed the demographic data they collected on their website. While the Keene Police Department did provide the public with recent demographic data on arrests, motor vehicle stops, and subject stops without the need for a formal request, the data's clarity and usability are lacking in several ways that impair the effectiveness of the page.

First, offering the data in an external PDF document does not lend itself to easy interpretation by the user. Providing the data in this form requires that the user have a PDF reader, which many modern computers do, but is an extra hurdle, nonetheless. It also does not allow for any engagement with the data, including filtering and sorting.

With the protype application developed using the same data that the Keene Police Department provides to the public their PDF, I attempt to remedy some of these shortcomings.

These protypes have been coded in Python using the Pandas and Plotly libraries, which are free, well-documented resources and easy to use for the average software developer. These interactive graphical tools can be easily integrated into any modern website. In Figure 2, we see how the application allows for more user engagement by allowing them to hover over a single piece of data to learn more about it.

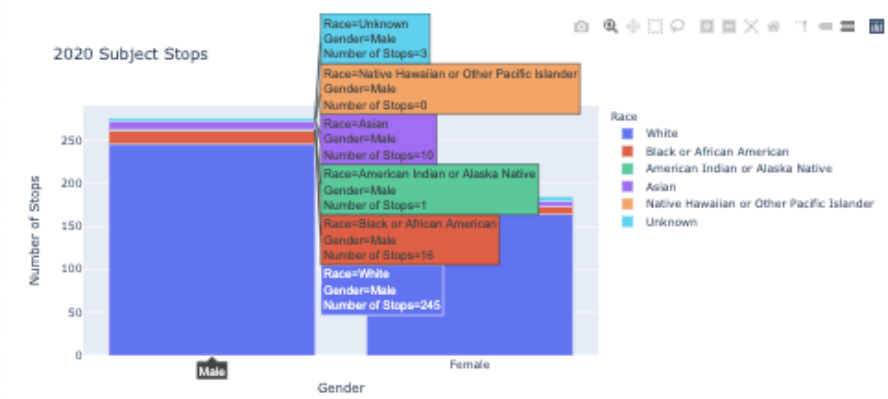


Figure 2: Engagement capabilities in our prototype application

Another main problem with data presentation was the lack of context. As the website exists now, when a user navigates to a police website to gain information about biased policing in their area, they are not able to do so without conducting some background research of their own. For example, in order to see if the raw numbers and percentages are reasonable for the area, a user would need to find the latest census data of the town and the area surrounding it. To alleviate some of this burden, the new proposed interface puts these numbers in context with the demographics of the area, as shown in Figure 3. The full application provides demographic data for the town, county, and state that the police department resides in from the six most recent years available. This allows users of the site to draw their own conclusions from the data and provides them with the tools to do so.

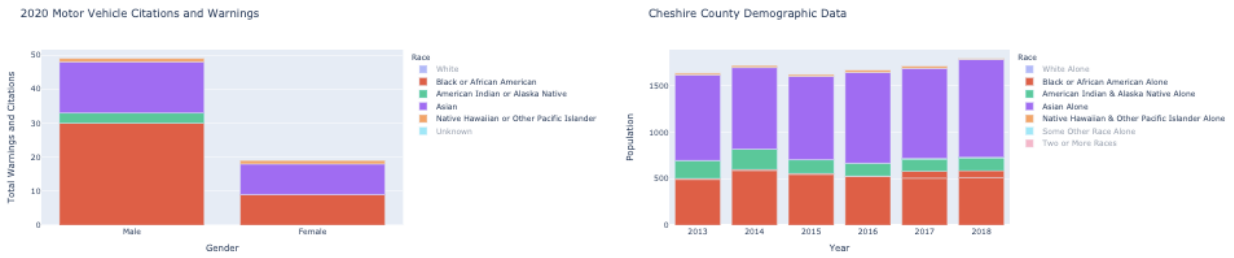


Figure 3: Filtering capabilities in our protype application

When integrated into a police department website, this data visualization tool could be a powerful asset to activists, journalists and to the general public by providing more engagement and context for the demographic data that is collected by police. Among the police departments I worked with for this study, only one department had their demographic policing data publicly available, without the need for a formal request. Still, their user interface was lacking in clarity and interpretability. By introducing visualization tools to these websites, police departments can achieve a greater level of transparency and accountability with the people they serve.

## 5. Conclusions and Opportunities for Further Research

There are a number of opportunities to further investigate the issue of police data collection, transparency and accessibility. While all police departments included in this study met a CALEA accreditation standard for demographic data collection, this is not the case for all police departments in the state. Similarly, to make any recommendations for data collection at the national level, more research needs to be done on the extent to which other states have mandated or failed to mandate demographic data reporting. Furthermore, in order to further develop my prototype data visualization application, more usability testing can be done using real police data and feedback from potential users and stakeholders.

One difficulty when developing the application was providing an accurate dataset with which to compare the policing data. This problem was remedied by using three different

demographic datasets from the most recent U.S. Census taken at the city, county, and state level. In future development of this application, I would be curious to use a more advanced method for determining the aggregate demographics of the people that reside in and pass through the district of the given police department. This could be obtained by making use of popular traffic patterns and the geography of the town. By putting to use a more precise dataset with which to compare the police data, the average user may be able to get a more accurate sense of biased policing in the area. However, using a more complex method to determine the demographic composition of people living in and passing through an area may introduce another element of ambiguity to the user, which would impair the application's goal of data transparency. Making use of data taken directly from the U.S. Census increases the likelihood that the user is familiar with the dataset and comfortable drawing conclusions from the data they are engaging with. This example of a future direction for this project would be another candidate for usability and effectiveness testing.

This case study of police departments in New Hampshire reveals a substantial problem with the manner in which data is collected and communicated to the public. Without these crucial pieces of data, researchers and journalists must rely on individual stories and data collected from other sources to learn and inform the public about the issue of biased policing. These stories are often dismissed by law enforcement and others as flaws in the system, isolated incidents, or the actions of "a few bad apples". When no other data publicly exists to show that the contrary is true, it is difficult to demonstrate the reality of biased policing. By improving upon the methodology for collecting demographic data and making this information available to journalists and the public at large, evidence of biased policing will be not as easily ignored. In

turn, by reporting these numbers on a regular basis, law enforcement will be held accountable to the public to report accurate, reasonable demographic numbers relative to the geographic area.

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