IMPLEMENTING PREDICTIVE POLICING:
A POLICY ANALYSIS APPROACH

By

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Abstract
Predictive policing techniques have grown rapidly in both sophistication and use over the past decade; yet, there is a large amount of legal and public pushback against the concept. This thesis aims to address privacy, equity and efficacy concerns by examining the accuracy and fairness of existing predictive policing mechanisms. After providing a background on both conventional and predictive policing methods, I then introduce a framework of best practices for predictive policing implementation for policy-makers and police departments to follow. To provide examples of the framework in action, I describe how various departments have implemented predictive policing and discuss the implications of such. Finally, the paper concludes with overall policy recommendations and key takeaways for future use of predictive policing technology.
I. Introduction

Predictive policing refers to the application of mathematical, analytical and evidence-based intervention techniques in law enforcement to anticipate, prevent and reduce criminal activity.¹ When implemented successfully, predictive policing policies can help reduce crime, mitigate risk to law enforcement officers, inform effective resource allocation, and reduce bias and/or human error in arrests. However, if predictive policing technology is put into place without consideration of stakeholder perspectives, effective support structure, or sufficient training, inequities and biases can be exacerbated. It is crucial for policy makers to understand the nuances of predictive policing policies that are being put in place in order to ensure public safety and be able to routinely review the police activity in their area.

In this paper, I will address this problem by evaluating existing predictive policing policies, developing a framework for implementation and review of these measures, and showing how this framework could enhance decision-making in different jurisdictions. By examining the accuracy and reliability of current predictive policing initiatives, I will develop mechanisms that jurisdictions adopting predictive policing initiative can use to ensure their systems are effective efficient and fair. This paper will explore the evidence on how jurisdictions have used these mechanisms in practice and what their experiences have been. I will conclude by giving policy recommendations for implementation and review of predictive policing measures.

II. Background

The term predictive policing is currently defined by RAND as “the application of analytical techniques, particularly quantitative techniques, to identify promising targets for police intervention with the goal of reducing crime risk by preventing future crimes or solving past crime.”² This term was first coined by Police Chief William Bratton of the LAPD in 2008. While working closely with the National Institute of Justice and the Bureau of Justice Association, Bratton expanded upon what this policing strategy would entail stating: “Predictive policing tries to harness the power of information, geospatial technologies and evidence-based intervention models to reduce crime and improve public safety. This two-pronged approach — applying advanced analytics to various data sets, in conjunction with intervention models — can move law enforcement from reacting to crimes into the realm of predicting what and where something is likely to happen and deploying resources accordingly.”³ Bratton envisioned this new form of policing to be a combination of community-led policing and intelligence-led policing. In this section, I will provide examples of current policing practices in order to highlight the differences with predictive policing practices and those currently in place.

A. Existing Policing Strategies

Predictive policing measures are meant to complement and enhance traditional and community policing practices. Traditional policing involves officers answering calls

and patrolling communities, looking for crimes that have occurred or that are occurring. Traditional policing can be dependent on heuristics or assumptions about the area, essentially an officer’s “hunch” of where crime might be occurring. Under the traditional police service model, the metric for success is detection and arrest rates.\textsuperscript{4} Traditional policing is largely reactive and consists of solving crimes after the fact.

Community-oriented policing involves officers partnering with their communities to help solve problems and to attack the core problems that lead to crime in the first place. Community policing follows the S.A.R.A. model: Scan, analyze, respond, assess.\textsuperscript{5} Precincts which follow this model are assessing their success not by response times or arrest rates but lower crime rates all around. The more a police department knows about the community they are serving the better chance of success they have to reduce crime.

Predictive policing differs from these by the collection and reliance on data analysis for decision-making. Whereas traditional policing is reactive, predictive and community policing are both proactive with a shared goal of prevention of crime. Programs such as CompStat have become the standard for data collection and intelligence-led policing.

CompStat, short for Compare Statistics, is a performance management system that is used to reduce crime and achieve other police department goals. Compstat emphasizes information-sharing, responsibility and accountability, and improving effectiveness. It includes four generally recognized core components: (1) Timely and accurate information or intelligence; (2) Rapid deployment of resources; (3) Effective


\textsuperscript{5} "The SARA Model | Center for Problem-Oriented Policing." Accessed April 30, 2019. \url{https://popcenter.asu.edu/about/sara}.
tactics; and (4) Relentless follow-up.\textsuperscript{6} CompStat consists of data collected by officers in their stops, arrests, and reports from the previous month. This information is typically presented in a department CompStat meeting where police captains or unit leaders present their “numbers” for the month. These figures can include number of arrests, areas of high crime, or crimes committed. From there the command will strategize how to improve the stats with the aforementioned core components.

The NYPD attributes a 75\% reduction in crime in the past 20 years to the implementation of CompStat.\textsuperscript{7} The city had 1,946 murders in 1993 and only 352 in 2015. Department leaders credit the change to more informed and pointed policing practices. However the effectiveness of CompStat and CompStat like programs are highly and frequently disputed. While the 75\% drop in crime experienced by NYPD is verifiable, establishing a causal relationship between reduction and CompStat is difficult given the many other factors that contributed to a nationwide crime rate drop in the 1990s.\textsuperscript{8} Additionally, the emphasis on statistics and numbers brought up by the rise in CompStat has contributed to excessive, unlawful and biased policing across the country. NYPD has had a fair share of class action lawsuits regarding the subject. Cities like Baltimore and Chicago have had DOJ investigations finding that the police departments made unconstitutional arrests, used excessive force and utilized enforcement strategies

\textsuperscript{7} Bureau of Justice Assistance, 6.
that produced severe and unjustified disparities in the rates of stops, searches, and arrests of African Americans.⁹

B. Goals and Obstacles of Predictive Policing

The goals of predictive policing are multifold: risk mitigation, resource allocation, crime reduction, and to decrease human error and/or bias.¹⁰ With increased and up-to-date intelligence available due to predictive policing measures, jurisdictions can strategically reduce risk to officers and civilians by making informed decisions based on collected data rather than heuristics. This data can also help jurisdictions to accurately deploy resources to where they are most needed. Accuracy and efficiency are both important elements to effective crime response and reduction, by utilizing predictive policing measures a jurisdiction could plausibly see a decrease in crime and human error. However, due to it’s relatively recent rise in application, few conclusive long-term studies of predictive policing strategies have been conducted. Although predictive policing models are being deployed by many jurisdictions, there is neither a uniform approach to implementation nor evaluation of the mechanisms being used.

Predictive policing mechanisms seek to identify three major areas: victims, perpetrators, and geo-spatial factors contributing to crime.¹¹ The usage of mathematical, predictive analytics and other law enforcement techniques can identify these major areas that have an elevated potential for criminal activity. The ability to successfully

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¹¹ Perry, 5.
predict crime is justified within criminological theories such as the routine activity theory or crime pattern theory. The theories which support predictive policing measures consists of several core tenants:

1. Criminals and victims follow common life patterns; overlaps in those patterns indicate an increased likelihood of crime.
2. Geographic and temporal features influence the where and when of those patterns.
3. Within these patterns, criminals make “rational” decisions about whether to commit crimes, taking into account such factors as the area, the target’s suitability, and the risk of getting caught.

The blended theory approach to criminology allows for predictive policing mechanisms to create predictions based on the likelihood a crime will be committed in a certain time, place or by a certain individual. The following are some examples of predictive policing methods used to create predictions:

1. Hotspot analysis and crime mapping is a strategy which predicts where a crime is likely to occur by synthesizing historical crime data. The underlying assumption is that crime is likely to occur where it has in the past given that criminal activity is not uniformly distributed across a jurisdiction. Utilizing hot spot mapping, a precinct may take action by increasing patrol units or other resources in areas indicated to be at risk for high crime. This method has been shown to reduce criminal activity and does not lead to the displacement of crime. Hotspot

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12 Perry, 7.
analysis differs from traditional policing practices by allowing a specificity of grid mapping not possible by heuristics alone. For example, while a police officer of a particular jurisdiction has a decent understanding of the lay of the city and can identify where crimes are more likely to occur in general, hot spot mapping uses data from all arrests over time down to the exact location where they occurred.

2. Similar to hot spot mapping, risk terrain analysis relies on historical crime data to identify geographic features that have been involved in or near criminal activity, from there predictions may be made about crime risk based on proximity to said features. Geographic features that can be considered to contribute to a higher risk of crime are establishments such as bars, casinos, sporting arenas, parking garages and etc. Jurisdictions may use these predictions to increase law enforcement resources and mitigate risk associated with the area.

3. Social Mapping is a method of predictive policing that is focused on the individual. This could involve social network analysis or regression models using risk factors to identify those who are more likely to commit crimes or those who are at higher risk for being a victim. Social mapping can help law enforcement visualize social circles of gang members and predict those who may be potential future members. Once individuals are identified as high risk, police interventions could range from patrolling the areas where individuals reside to more aggressive interventions – such as talking to identified individuals or their

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family members. Social mapping has been used successfully by the LAPD and Chicago PD. By drawing on police and other data and applying social network analysis, the Chicago police department assembled a list of roughly 400 individuals identified by certain factors as likely to be involved in violent crime. As a result, police have a heightened awareness of particular individuals that might reflect factors beyond charges and convictions that are part of the public record.\textsuperscript{16}

\textit{C. Obstacles of Predictive Policing}

The existing criticism of COMPSTAT highlight some of the common concerns many have regarding Predictive Policing strategies. Most revolve around whether the strategy is fair and effective. Although COMPSTAT is now considered traditional policing, given the analysis of crime statistics and data employed it serves as the foundation for many department’s newer predictive or intelligence-led policing.

Unfairness in predictive policing may stem from the data being collected by police officers. There is a concern that if officers are reporting biased or erroneous data, then minority neighborhoods will be the target of directed police patrols leading to higher discriminatory arrest rates. This would theoretically create a self-fulfilling proficiency in which departments are affirmed of their data and predictive technology being correct and effective and thus continuing to target minority populations.

Although there have been no empirical studies conducted that prove this to be true there have also been few studies which prove this to be false. Alternatively, many proponents of Predictive policing believe the use of quantitative data to narrowly define high crime areas will require police to rely on more than a "hunch" to prove that an areas has a high propensity for crime. This acts as a form of accountability on the police which may help to reduce arbitrary or biased stops.

Similar to CompStat, one concern regarding the effectiveness of PredPol measures is evaluation for effectiveness. While crime rates fell in the 90’s there is no concrete evidence which affirms that CompStat was the cause of the reduction in crime. For example, Chicago PD attributed a 21% decrease in shootings from 2016 to 2017 to PredPol. The Philadelphia Project found a 31% decrease in property crimes due to PredPol. While promising numbers, the few existing third party evaluations and studies have been inconclusive in proving these reductions to be the product of predictive policing strategies.

Another concern of predictive policing is the possible erosion of Fourth Amendment rights for individuals in high-crime areas. Under current law, an area characterized as “High Crime” can constitute “reasonable suspicion” to stop a subject.

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The Supreme Court held in *Illinois v. Wardlow* that a neighborhood which is characterized as “high crime” is a legitimate contextual factor for reasonable suspicion and can count as one of the two-factors needed to initiate police contact. Under this precedent, an officer deployed into a neighborhood based on a predictive analysis via crime mapping would have one of the two factors to initiate a stop satisfied by the predictive data. The concern is that individuals within areas that predictive policing notates as high crime will have a lesser expectation of privacy than those living in surrounding areas.

The threshold for “reasonable suspicion” in areas that have been highlighted by predictive policing is lower given the assumed likelihood of crime in the area. Additionally, if officers are being directed to areas designated by predictive technology as “high crime” and their ability to make stops is bound only by the two-factor test, of which one is already satisfied. Therefore it would be easier for police officers to make more stops which may yield more arrests, this data would affirm the “high-crime” characterization and the cycle would repeat.

Aside from the concern of Fourth Amendment rights, there could be unintended socio-economic consequences. Areas which are designated high crime and caught in the aforementioned cycle, would be further stigmatized as their characterization leading to flight from the area, less development, and less investment into the community. The emergence of predictive policing technology in relation to the Fourth Amendment and the *Wardlow* decision is one the courts have yet to address.

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III. Life-Cycle Approach to Predictive Policing Implementation

In this section I will introduce a framework for a fair and efficient implementation, utilization, and review of predictive policing strategies. This framework is intended as a map to understand how predictive policing technologies operate within existing police and community structures. My goal is to emphasize the important aspects of the framework for the benefit of policy-makers and police departments. While existing frameworks such as that introduced by RAND provides detailed steps and methodology, my goal is to simplify the essential items necessary for successful policing policy implementation. By emphasizing transparency and methodology in the formation and application of predictive policing technology, I believe many of the obstacles facing predictive policing can be overcome.

*Step 1: Identify the Problem*

The first step in implementing predictive policing policies, or any policing strategy, is to identify a departmental need or community concern that requires attention. Identifying a department need can be based on reports and recommendations from internal affairs, holding team meetings to assess the areas for opportunity or discussed at command meanings. However, it is in the department’s best interest to promote transparency and community involvement in budget decisions and strategy implementations. One way to do this is to establish a civilian oversight committee.

Oversight committees consist of community members dedicated to reviewing and improving police officer conduct.23 The committee can offer a unique perspective on

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community needs that the police may not be able to recognize. Additionally, most committees operate as review-oriented bodies and will be able to identify areas of opportunity for police to increase their community standing and correct any misconduct. As of 2019, over 78 agencies have adopted some form of civilian oversight. The National Association for Civilian Oversight of Law Enforcement found that 49% of agencies’ oversight bodies were established following high-profile incidents and 30% from concerns about racial violence. Although not formed under ideal circumstances, these bodies help identify community concerns and police conduct issues that may be addressed by the implementation of new predictive policing technology. I will later discuss the community’s role in the implementation of new policing initiatives by their ability to independently review effectiveness and gauge community support.

The first step towards a new policy is identifying department needs and community concerns. Existing measures other than civilian oversight committee to determine needs can be citizen satisfaction surveys or town hall meetings. By opening a dialogue with the community, law enforcement departments are also able to communicate their internal issues such as a shortage in officers or lack of support staff. Given the nation-wide officer shortage, it is likely that increasing their ability to efficiently police the community with less manpower is a top concern. Since 2013, the total number of working sworn officers has fallen by about 23,000. The number of officers per capita is down even more sharply, from 2.42 per 1,000 residents in 1997 to 2.17 officers per 1,000 in 2016.

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In identifying problems regarding specific crimes, historical crime data may be used to determine the rising trends of particular types of crime and the areas they are most prevalent. For example, police departments can analyze the historical crime data to determine if there is a rise of property crimes and where they are likely to occur, and then can reach out to those affected communities for their input. This establishes an actionable problem for both the police and the communities affected and a need for a change in policing policy if existing conduct has not contributed to the decrease of that particular crime.

Step 2: Establish Data Collecting Practices

As mentioned in step one, a valuable resource for determining crime trends and community needs is historical crime data. Before implementing any sort of new policing practice, predictive or otherwise, the data from inferences are being made must be verifiably accurate and up-to-date. This is especially true of predictive policing measures, the volume and quality of data collected will affect the usefulness of any approach. A department must evaluate their existing data collection practices and resolve any discrepancies before relying on it for predictive analytics.

One obstacle of predictive policing initiatives discussed is the “Garbage-in, garbage-out” mentality, where if the data collected is biased or incomplete the predictive technology will not be accurate and may exacerbate equity concerns. In the case of Seattle PD, the department opted to overhaul their data collection process. They streamlined the approach to collecting, entering, and storing data so that officers

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26 Perry, 13.
and staff of any ranking were aware of the expectations and goals of the data being collected.\textsuperscript{27} Other agencies opted to hire non-police data analysts and database managers to evaluate their existing processes and look for any weaknesses or blind spots to be addressed.

Departments can leverage their existing COMPSTAT initiative and data collection process as part of this process. Data from stops, existing law enforcement databases, status offenses, and 9-1-1 calls are all methods of collection for agencies. The goal of this data should be to give law enforcement officers situational awareness on recent crimes and criminal intelligence, tailored to specific locations or roles.\textsuperscript{28} RAND found that tools for data collection may vary greatly from high-end “business intelligence dashboards” providing tailored, web-based geospatial displays to PowerPoint slides or PDF maps. The sophistication and complexity needed from data collection technology will vary by the size and culture of the department.

There are 4 main types of data tools in law enforcement: narrative tools, network analytics, spatiotemporal analytics and common operational procedures.\textsuperscript{29} Narrative tools consist of records and notes of entities and events of interest, they allow officers to focus on the specifics of an area, a person, or an event and are updated as new information related to the topic comes in. Network analytics show relationships between entities and events or may be the result of social network analytics. Spatiotemporal are devoted to marking the time, place, and circumstances of crime occurring. These three help to form common operational procedures. This may include information on recent

\textsuperscript{28} Perry, 128.
\textsuperscript{29} Perry, 135.
crimes, crime patterns, field interview locations, outstanding warrants, etc. It is essentially the culmination of all data collection efforts that is then displayed in a user-friendly way.

**Step 3: Identifying Potential Methods**

Dependent on the department need or community concern, predictive analytics may not always be the best course of action for a department. Conventional analysis or policing methods such as crime Mapping, basic regression models, assumption of increased risk in areas immediately surrounding a recent crime, and/or drawing inferences from locations with greatest frequency of crimes may be enough to reduce specific crimes and inform resource allocation. More advanced predictive analysis to predict specific crimes may include advanced hot spot identification models, risk terrain analysis, clustering and classification models, near-repeat modeling, spatiotemporal analysis methods. The predictive measures will provide more accurate and updated information for tactical action but this may not always be required to reduce crime. Richmond PD for example, employed advanced hotspot and risk terrain analysis, created and up-kept by PredPol, for three years and yet found no significant advantage over traditional policing techniques.\(^{30}\) This could be attributed to many factors but nonetheless serves to signal the reluctance for some law-enforcement agencies to adopt new predictive standards when traditional policing can reduce crime at similar rates.\(^{31}\)


In terms of predicting identities of criminals or perpetrators, traditional policing methods would include: manual review of incoming gang/criminal intelligence reports, and clinical instruments that summarize known risk factors. This can be beneficial for smaller towns or precincts or departments with meticulously upkept narrative tools. In predictive analytics tools such as computer assisted queries and analysis of intelligence and other databases, statistical modelling, geographic profiling tools, and social mapping can all be utilized for the same goal. It’s worth noting that departments do not have to choose predictive technologies only, many can be used in conjunction with traditional policing for a holistic approach to preventing crime.

*Step 4: Cost-benefit analysis for the department*

After the need has been identified and data has been collected, in order to decide on a preferred approach or method of predictive policing technology, the department must consider the associated costs and benefits of implementation. These include the cost of hiring new personnel staff to upkeep technology and/or train the department in how to utilize the tools; the technology itself and associated licensing costs; the time spent training and installing technology; and possibly the creation of dedicated units towards data analysis. Small agencies with relatively few crimes per year and with reasonably understandable distributions of crime are unlikely to need much more than core statistical and display capabilities. These tools are available for free or at low cost and include built in capabilities in Microsoft Office, basic geographic information tools, and/or base statistics packages.32 Larger agencies with large volumes of crime and

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intelligence data will require more sophisticated and complex software to be advantageous. With more complex software comes higher prices of the associated costs listed above, with an emphasis on technical training and privacy training.

One benefit of employing predictive policing is the increased accuracy of resource allocation. If a department is struggling in terms of manpower, they are able to more accurately distribute patrolling officers to areas with a higher propensity for crime increasing the relative “value” per officer employed. The value in this case being predicted crime reduction. This is in comparison to traditional policing methods in which officers are assigned beats by arbitrary means or heuristics. Traditional policing in this way negatively impacts the reputation of certain neighborhoods if their reason for being there is not clear cut or informed by data. Increasing the accuracy of assignment where police services are more needed or warranted leads to better utilization of resources.

*Step 5: Implementation*

Implementation of predictive policing technology plays a crucial role in ensuring its success. First, a department must address what structural changes are necessary, if any, to implement the technology. While this will have likely been discussed in the cost-benefit analysis stage, at this point the department should establish the training protocols, dedicated staff members to upkeep and maintenance of the technology, as well as any additional technological changes or additions. In regards to training it should be communicated to officers and command staff the reasons for this technology, what the goals of implementing it are, and the expectations of proper utilization. Training on the new technology should be tested for competency and frequently
The culture of the department must be accepting of the new policies and possibly open to the consequent reorganization of certain departments that work closely with intelligence or beat work.

Transparency to the community is just as important as internal transparency. The community should be made aware of the shift in policing techniques as well as have their preliminary concerns addressed. Any and all questions regarding Fourth Amendment rights and existing privacy are those which are likely to be asked given the nature of the new technology. This can be communicated in a variety of ways. For example, Seattle PD chose to hold town halls and weekly updates available online and open to the public.

**Step 6: Evaluation and Review**

One of the biggest obstacles for predictive policing technology currently is the lack of conclusory evidence regarding its effectiveness and impact. It should be encouraged and welcomed for third party researchers to do evaluations about the policing practice, this is beneficial to both policymakers and the police. For example, the evaluation of the Shreveport Predictive Policing Experiment found that although there is no conclusion regarding its effectiveness on reducing property crimes, there was a perceived benefit for the officers by providing information-based targeting decisions and there was a more efficient use of department resources. These key findings help to

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33 Perry, 82.
inform future implementations as well as allow the department to adjust their current practices for more optimal results.

The metrics which can be used to evaluate effectiveness will vary based on the concern which is being addressed by the predictive policing technology. Common metrics may include decreased reporting, increased arrests and convictions, citizen satisfaction surveys, answers from victim questionnaires, lower overall crime rates, and/or increased efficiency of resources. Additional metrics used to gauge equality, social cost, and quality of life are also important and deserve to be measured as well. The difficulty in evaluating the impact of predictive policing methods on these metrics is in eliminating the other possible elements which may have contributed or independently led to the same results. There is no way to completely create a perfect isolated study of the impacts of predictive policing technology given the nature of policing and criminology. However, by observing the trends and tracking the changes from implementation of predictive policing over sustained periods of time, and comparing with jurisdictions that have not implemented predictive policing, we may have a bigger picture available to understand the reason for certain trends and if predictive policing is in fact beneficial to the community or department.

IV. Learning From Departments That Have Implemented Predictive Policing

To show how this framework works in practice, I looked at implementation of predictive policing in five departments as case studies including Los Angeles Police Department, Seattle Police Department, Houston Police Department, Hanover County Sheriff's Department and Charlotte-Mecklenburg Police Department. These
departments vary greatly in operations, organization and goals. In this section, I describe how the departments have implemented predictive policing and discuss the implications of such.

A. Case Studies

From over twenty departments, the list was narrowed down to show the widespread application of predictive policing and how it varies depending on department culture. The departments were selected based on their diversity of size, areas served, type of predictive policing, and overall missions. The goal was to select departments which implemented predictive policing in their districts and compare their methods for selection, implementation and evaluation to the framework provided.

Each department had strengths and weaknesses of their use of predictive policing and each excelled at different stages of the framework. The chart below provides a brief overview why the department was selected as a case study and a summary of the actions they took at each step. As noted earlier, one of the obstacles involved in evaluation of effectiveness of predictive policing technologies is the lack of third party evaluations and comparisons to eliminate variables other than the technology. The case studies show briefly the different outcomes which predictive technology may have for a jurisdiction but there are no hard line conclusions of their success.
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<tr>
<td>Seattle</td>
<td>Example of the current and most widely followed “PredPol” initiatives</td>
<td>DOJ probation and excessive force reports</td>
<td>Overhaul of existing data, overtime for officers</td>
<td>SEASTAT = quasi-predpol, SPD is only beginning to look at pred pol but has strong foundation for doing so</td>
<td>Consideration of salaries v. overtime v. training but more info needed</td>
<td>Community involvement at every step, SEASTAT public meetings every 2 weeks</td>
<td>Audit of data, Citizen oversight board, continually adjusting strategy</td>
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<td>Los Angeles</td>
<td>Example of large department with sophisticated predictive policing technologies</td>
<td>Sophisticated and widespread measures to collect data including social mapping and COP</td>
<td>Unclear if conventional policing was compared to PredPol options.</td>
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<td>Emphasis on easy interface for officers and training on technology for smooth transition and consistency across the board</td>
<td>Huge public pushback not being considered, STOP LAPD co-op, multiple lawsuits</td>
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<td>Houston</td>
<td>Example of a large department in a metropolitan city with NO predictive nor quasi-predictive policing measures. Poor transparency and community satisfaction, high crime.</td>
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<td>Hanover County</td>
<td>Example of a small/rural department using predictive policing aggressively and effectively</td>
<td>Resource allocation, small # of officers but large jurisdiction</td>
<td>Updated record management</td>
<td>Predictive policing GIS software and new computer automated dispatch (CAD) system</td>
<td>Utilizes specialized civilians to be trained with only PredPol tech, allows for officers to be in field</td>
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<td>Charlotte-</td>
<td>Example of a medium size department with high community approval that utilizes hot spot mapping, heavily leased technology (IBI)</td>
<td>Feedback received by multiple levels and classifications of staff but not community</td>
<td>Consolidated data and developed BI dashboards and reports that can be viewed in patrol vehicles</td>
<td>Real-time updates from software informing police doing traditional beat-work to make community policing efforts more focused</td>
<td>PrePol implementation has streamlined approaches to crime fighting and lowered overall operating costs.</td>
<td>No community involvement noted in the implementation step</td>
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<tr>
<td>Mecklenburg PD</td>
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<td><strong>Includes reporting feature which flags officers for certain irregularities in reporting that may indicate unethical behavior.</strong></td>
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**Table 1: Implementation of Predictive Policing**
Seattle Police Department

Seattle is an urban city with a population of around 713,000. Seattle PD has a staff of 1800 including both officers and civilian support staff. In 2011, an investigation conducted by the Department of Justice found that SPD had engaged in “a pattern or practice of excessive force that violates the Constitution and federal law.” As a result the department leadership moved their focus to employing better data collection and informed policing strategies to comply with the DOJ’s governmental decree and decrease the amount of property crimes. SPD created and implemented a program called “SEASTAT” named after its inspiration, COMPSTAT. Per step 2 of the framework, Seattle PD did an excellent job in reforming their data collecting practices.

To understand which policies would be best to decrease complaints and arrests, the whole department began a “collect-as-you-go” initiative to catalog data in a newly organized fashion courtesy of SEASTAT. All staff and officers were trained on the ways in which data should be recorded including community complaints, incident reports, geospatial locations of crimes, 9-1-1 calls, license plate information and other forms of field data. COMPSTAT was used to provide statistical data at command meetings around once a month, the chief of the SPD’s goal was to real-time data and adjustments in policing strategies. Therefore, criminal statistics were reviewed and presented on a daily and weekly basis to update crime maps and beat assignments to “At-Risk”

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neighborhoods. In the first year of implementation, SPD observed a 10% decrease in car thefts (44% to 34%) and major crime was reduced by 10%.³⁷

SEASTAT does not constitute true predictive policing technology but represents what is being done by the majority of precincts operating at a medium-large departmental scale across the country. SEASTAT and other similar data collection and analysis methods are the foundation for effective future predictive policing technology to be implemented.

Additionally Seattle PD excelled in their engagement of the community throughout the implementation and evaluation steps. Public relations was of high priority given the DOJ investigation status, as result there were weekly community board oversight meetings and constant polling of public opinion regarding police technology. This gave Seattle PD better visibility within the community and enthusiasm for future more predictive or complex technologies to be accepted.³⁸

Los Angeles Police Department

LAPD is an example of a large department with a staff of over 12,000 overseeing a population of 4,030,904 citizens.³⁹ LAPD was where COMPSTAT was invented and has since been established as one of the premier predictive policing departments. Similar to Seattle PD, LAPD faces a large amount of public pushback against their collection and use of data. LAPD’s primary goal in their most expansive data collection and predictive technology is reducing gang violence and other major crimes by

³⁸ Id.
predicting potential offenders. By using technology such as social mapping, geo-spatial analysis and hot spot mapping, LAPD was believed to be able to create a larger picture of the actors in play regarding major crime. However, as of April 2019, a 52-page audit found that the department’s data analysis programs lacked oversight and that officers used inconsistent criteria to label people as “chronic offenders.” Additionally, the effectiveness of the geospatial targeting could not be determined. The study concluded that it is likely the existence and utilization of “dirty data” and lack of evaluation are to blame for the programs’ shortcomings.

This comes following many lawsuits from public groups, such as the “Stop LAPD Spying Coalition”, against the data collection processes used by LAPD. LAPD’s mistakes in this scenario are a lack of transparency with the community about their policies and how the technology is being implemented, leading to many to believe their privacy rights are being violated. Additionally, improper data collection and lack of evaluation (Steps 2 and 5) have resulted in all programs being rolled back and LAPD returning to conventional modes of policing, with manuals expected to be rolled out by summer. It is unclear as of now if their intention is to bring back predictive policing technology in the future.

Houston PD

Houston Police Department serves as an example of a large department in a metropolitan city with NO predictive nor quasi-predictive policing measures. Houston is

\[40 \text{“LAPD data programs need better oversight to protect public, inspector ....” Accessed April 30, 2019.}\]
\[41 \text{“LAPD to scrap some crime data programs after criticism - Los Angeles ....” Accessed April 30, 2019.}\]
considered one of the most dangerous cities in Texas and as, result, faces large community unrest over high crime rates. The department’s chief has stood firmly against predictive policing technology for quite some time and instead emphasizes worn body-cameras as means of evaluating officer accountability and encourages traditional policing practices. In a statement regarding the yearly operations of HPD, the department states: “For the past few years, the HPD has been exploring the emerging software applications that support experimentation with ‘predictive analytics.’ Despite the hoopla by vendors and some police agencies, true predictive analytics are not nearly as robust as they are made to sound. Nevertheless, it is a process meriting attention and despite local criticism directed towards the HPD as being out of touch with ‘new approaches,’ nothing could be further from the truth.” However, due to an increased officer shortage, the need for more efficient resource allocation has gone up. The department is now in step 3 of evaluating how predictive policing might relieve resource strain across the department.

Hanover County Sheriff’s Office

Hanover County Sheriff’s Office is comprised of a staff of 238 who oversee the 100,000 citizens of Hanover County. This case serves as an example of a small/rural community.
department using predictive policing aggressively and effectively. Although the population is rather low, the nature of the county is extremely spread out and diverse terrain. Hanover County looked to predictive policing methods as a solution for the resource allocation challenge faced by a small department such as theirs. In 2015, the Sheriff’s Office implemented a new records management system which allowed them to make more accurate and precise predictions of crime when paired with their predictive policing GIS software and new computer automated dispatch (CAD) system. As a result the officers feel their investigations have been shifted from “reactionary” to “proactive”. It has also allowed for more effective allocation and placement of law enforcement resources, contributed to a measurable decrease in crime, provided a practical guide for county growth and strategic planning initiatives, and helped to foster strong partnerships with county planning agencies.\textsuperscript{46} HCSO shows that a large department or budget are not necessarily needed to benefit from predictive policing measures. HCSO additionally had a documented implementation strategy which emphasized proper training of officers and dedicated analytic staff to ensure smooth roll out of technology.

\textbf{Charlotte-Mecklenburg PD}

Charlotte-Mecklenburg PD is a medium sized department with a staff of 2,225 overseeing a population of 777,827.\textsuperscript{47} Their primary goal in implementing hot-spot mapping technology is to decrease the amount of property crimes as well as increase officer integrity and transparency for the community. Charlotte-Mecklenburg is one of

the departments who chose to lease predictive policing technology from Information Builders.\textsuperscript{48} Their leasing of BI dashboard technology allowed for a smooth rollout with minimum cost in terms of personnel and training but higher costs up front for installation of the technology. The advantage of this leasing agreement is that contracted Information Builders were tasked with addressing the issue through the framework. As a result, command staff felt better equipped to optimally assign officers to response areas with the highest likelihood of criminal activity, resulting in reduced crime and lower operating costs.\textsuperscript{49}

CMPD is currently testing software that would allow the same predictive analytics to flag officers who might be a risk for corruption or abuse of authority. An Early Intervention System (EIS) would essentially flag officers who may “be at a high risk for being involved in an adverse interaction.” Factors which may indicate an officer is at a high risk include use of force three times within 90 days or unusual arrests or increased traffic stops. From there the flagged account will call for a supervisor review to evaluate the legitimacy of the claim. Predictive analytics used to predict police misconduct have yet to be fully rolled out but CMPD is beginning the trend for predictive analytics as means to have greater accountability for officers.

\textbf{B. Lessons Learned}

The case studies demonstrate that predictive policing is not just for one type of department nor is it implemented uniformly across jurisdictions. It is difficult to

\textsuperscript{48} “CMPD’s Predictive Crime Analytics Implementation - Public Intelligence.” Accessed April 30, 2019. \url{https://info.publicintelligence.net/CMPD-PredictiveAnalytics.pdf}.

compare and contrast the effectiveness of each implementation or policy process given
the drastic differences in culture, size, goals, and technology used. There is a large
variation in how it is implemented and some work for departments while others do not.
For example, the leasing of information technology by CMPD is not one available to a
much smaller organization such as Hanover County Sheriff’s Department due to the
high up-front costs and complexity of upkeep. Additionally, in Seattle’s case, the process
of collecting and reorganizing data and involvement of the community at every step of
the way were vital to the success and longevity of SEASTAT.

All variations of predictive policing policy implementation can benefit from the
framework provided as they all follow the same general pattern. Departments such as
the LAPD and HPD who skip steps in the framework often face difficulties later on one
their predictive policing procedures have been implemented. LAPD’s predictive
technology is being withdrawn due to their lack of evaluation and review procedures,
and HPD is only now seeking out predictive technology, after completely writing it off,
due to a resource allocation crisis. Somewhere in the middle of extremes lies the
preferred way to implement predictive policing technology. Seattle PD excelled at
community involvement, reformed data collection processes, and evaluation
procedures; Hanover excelled at integration of processes and analysis of traditional
policing and intelligence-led in regards to their goals; CMPD excelled at cost-benefit
analysis in regards to the time and resources saved by outsourcing to a data-based
company.


V. Conclusion

Predictive policing is fast-growing yet remains in its infancy how policy makers and police departments move forward in efforts can define its likelihood of success and adoption. The keys to success for police departments in this field are increased transparency, community engagement and data preparation and overhaul preceding implementation. Transparency should be encouraged both internally and with the public. The goal should be comprehensive understanding as to the why initiatives are being implemented as well as how they are being executed and evaluated. The community can act as a valuable resource in gauging the effectiveness of new policing technology. Community oversight and enthusiasm increases likelihood of long term success in predictive policing initiatives. As seen in cases like the LAPD and Seattle PD, uniform data collection practices can make or break predictive policing technology. In order to avoid inequities or bias in their use, data must be collected following strict guidelines and continuously audited to assure its accuracy.

Policy-makers can assist in the ensuring predictive policing technology is beneficial and privacy-preserving by dedicating resources to outside review of practices. Organizations such at the National Institution of Justice and/or scholarly researchers can help to close the gap between inferred success of predictive measures and actual data of impact. Currently most studies and “results” of predictive policies cannot demonstrate the causal effects of the program. Further research is needed to conclusively identify the effectiveness of predictive policing technology.
Bibliography


