About MCRIC

This document was prepared by the Maryland Crime Research and Innovation Center (MCRIC) at the University of Maryland. The Maryland Crime Research and Innovation Center engages in research to inform local, state, and national crime reduction strategy and policy through data-driven scholarship by conducting rigorous interdisciplinary basic and applied research, developing and evaluating innovative criminal justice strategies aimed at reducing crime in the state, leveraging cross-agency networks to foster data integration, and actively engaging in translational science through wide and varied dissemination of research. MCRIC leverages the broad range of expertise at the University of Maryland to engage in innovative research and interdisciplinary projects to enhance community safety and inform data-driven decision making. MCRIC works with a variety of partners including communities and community-based organizations, police and practitioners, lawmakers, academic peers, and industry, to promote data sharing, exchange knowledge and best practices, and develop new approaches.

About the Project

This is the final report for the Assessment of Pretrial Outcomes project aimed at assessing the capacity of the Client Legal Utility Engine (CLUE) database for linking data across Maryland jurisdictions for research and analysis of pretrial outcomes of bail reform. This research was funded by the Maryland Governor’s Office of Crime Prevention, Youth, and Victim Services (GOCPYVS), Performance Incentive Grant Fund program. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the views or policies of the GOCPYVS, or the University of Maryland.
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Summary

Bail and pretrial decision-making is a central focus of criminal justice system reform efforts nationally and in Maryland. Key motivations driving reform efforts include concerns stemming from the extensive costs of detaining individuals before their day in court as well as the mounting evidence of negative consequences of pretrial detention as it relates to both criminal justice system and other outcomes. Following recommendations from the 2014 Governor’s Commission to Reform Maryland’s Pretrial System, in 2017, Maryland’s Court of Appeals adopted Rule 4-216.1 (hereafter “Rule”) designed to “promote the release of defendants on their own recognizance, or when necessary, unsecured bond. Additional conditions should be imposed on release only if the need to ensure appearance at court proceedings, to protect the community, victims, witnesses, or any other person and to maintain the integrity of the judicial process is demonstrated by the circumstances of the individual case. Preference should be given to additional conditions without financial terms.”

Despite these bail and pretrial changes, little is known about the operation of pretrial decision making in Maryland or the impacts of these efforts at bail reform. Locally, data restrictions have limited the ability to perform systematic research within and across jurisdictions of how pretrial decisions are made and if and how the 2017 rule change impacted this important point in the state’s criminal justice system processing. Information is needed to support efforts in Maryland to effectively reduce the local detention population while protecting public safety.

The Client Legal Utility Engine (CLUE) database offers a potential source of information to examine questions such as these both within and across jurisdictions in Maryland. The primary aim of this research was to extend and augment prior research efforts to validate the utility of using the CLUE database for evaluating outcomes of bail reform across Maryland. Initial evidence (Glazener et al., 2022) indicated that CLUE is a valuable resource to examine pretrial processes in two test counties (i.e., Prince George’s and Baltimore City). Whereas the initial test supported the use of CLUE as a valid and reliable information source for pretrial processes, these counties are not representative of the state as a whole.

The current report summarizes our efforts to expand this study to cover all 24 jurisdictions in the state, further validating the data in all jurisdictions and expanding our understanding of how pretrial decisions are being made in the state both before and after the 2017 rule change. Part of our efforts also include an exploratory examination of the role that risk plays in these decisions, leveraging our ability to link individuals across unique cases.

Key Project Takeaways:

- The Client Legal Utility Engine (CLUE) data are an important source of criminal justice system data that can be used to examine policy changes in Maryland’s criminal justice system.
- There are notable differences in data organization between counties in the CLUE data, and additional work needs to be undertaken to understand how these differences can affect analyses and if any differences are suggestive of data quality issues among certain types of counties.
- The release of the letter by the Attorney General requesting bail rule changes and the subsequent implementation of these rule changes are associated with large shifts in bail decision making across the state of Maryland. Preliminary analyses show both District Court Commissioners and judges came to rely
more heavily on holding individuals without bail as a result of these rule changes, with some shifts toward release on recognizance as well.

- Leveraging the use of probabilistic record linkage to identify the same individuals across cases and across jurisdictions, we performed analyses examining the role of risk in bail decision making. Analyses examining how initial hearing decisions align with the risk of violent rearrest indicate that after the bail rule change, District Court Commissioners’ decisions were more in line with the risk of future violence than before the rule changes.

- The CLUE data can and should receive further investment to take advantage of a unique dataset and the effort put forth to date to best utilize this dataset for future research. Additionally, there is a need to invest effort and funding to continue the data scrapping necessary for CLUE. This will need to include working with the state court system to provide a way to collect up-to-date, real-time data on court cases. Without additional investment, these data cannot continue to provide a source for examining outcomes of policy decisions, tracking trends and monitoring for disparities, and other valuable research requirements in Maryland.
Introduction

There is no statewide data resource that integrates all relevant information regarding criminal justice system involvement across jurisdictions in the state of Maryland. Current data on crime and criminal justice outcomes, such as arrests, criminal history, convictions, sentencing, corrections, parole, probation, recidivism, calls for service, etc., are largely siloed and managed by different organizations both at the state- and county-level. A comprehensive crime and criminal justice data structure would facilitate information sharing, cross-jurisdictional comparisons, assessment of strategies and policies to successfully prevent and reduce crime and/or limit the number of individuals who interact with and are held by the justice system.

The current project explores the utility of the Client Legal Utility Engine (CLUE) data to provide one source of comprehensive, statewide data covering all 24 Maryland jurisdictions (23 counties and Baltimore City). The CLUE dataset is a valuable and unique resource that can provide the state with an innovative tool for analysis of a variety of court decision-making processes, providing new insights and contributing to policymaking and crime reduction strategies. To advance understanding of the strengths and limits of the CLUE data for informing understanding of crime in Maryland, this project expanded prior work examining pretrial bail and detention processes in two test counties to include all 24 Maryland jurisdictions.

In this report, we first provide a brief outline of the research on pretrial processing and the recent reform efforts aimed at curtailing the use of pretrial detention and high bail amounts that have contributed to large populations housed in county jail pretrial both nationally and in Maryland specifically. As part of this discussion, we examine both the process of bail within Maryland and the reform efforts that have taken place over the prior decade or so.

Next, we describe the CLUE data and conduct quality assurance tests comparing the CLUE data to other sources of court data in the state of Maryland to vet this new data source. We then present preliminary, descriptive statistics on the state of bail and pretrial processing in the state of Maryland. These exploratory analyses help us understand how bail operates across jurisdictions in the state, and how these processes have shifted over time and in concurrence with bail changes in the state. These analyses are an important first step in exploring bail and pretrial outcomes across the state of Maryland.

We then describe the process of conducting probabilistic record linkage, to identify individuals across unique court cases across the study period. The ability to identify unique individuals across multiple court appearances allows us to understand how the same individuals are moving through the state’s criminal justice system across a time span of several years. Lastly, utilizing the linked sample, we present preliminary findings of an examination of how risk factors into bail decisions. These analyses are a first foray into using the CLUE data to understand how risk factors into decision-making at the pretrial stage.
Bail and Pretrial Detention

Pretrial decisions affect more than 10 million individuals annually who are arrested in the United States (Dobbie and Yang 2021). In Maryland in particular, the majority of the jail population in 2014 was composed of pretrial detainees (e.g., 85.79% of Baltimore City and 82.34% of Prince George County; Commission to Reform Maryland’s Pretrial System, 2014). Notably, the majority of individuals detained pretrial are accused of low-level, nonviolent offenses and pose little threat to public safety. The high rates of pretrial detention coupled with the low risk to public safety has fueled the recent policy and research focus on the practices and policies occurring before an individual is found innocent or guilty.

The workings of the criminal justice system in the pretrial stages have historically been understudied with limited information and data pertaining to how decisions are made to release an individual prior to their day in court and the conditions that should be assigned if release is granted. However, the last decade has seen a rapid diffusion of focus on and changes to the pretrial system across the nation (Pretrial Justice Institute, 2020). One example of these changes is pretrial bail reform. The rationale behind the concept of monetary bail is the premise that individuals will be more likely to return for their day in court or increased compliance with other court orders if they have a financial incentive to do so, however, recent research has called this premise into question (Ouss & Stevenson, 2021) and suggests instead that the use of monetary bail fuels inequality by punishing poverty (Scott-Hayward & Fradella, 2019).

Some work has begun to examine the many bail reform efforts that have taken place across the country in recent years (Pretrial Justice Institute, 2020). Bail reforms can stem from multiple actors in state and city governments, namely courts, prosecutors, cities/counties, and state legislatures (Jorgensen & Smith, 2021). One of the driving forces behind bail reform advocacy is the perceived discriminatory nature of a policy that requires an individual to be able to pay to be released from custody prior to any finding of guilt (Smith, 2022). Due to this requirement of ability-to-pay, individuals without the means to pay the monetary bail are disproportionately likely to remain in custody until their case is completed. Although there are varying types of bail reform, two common types of efforts focus on limiting the use of monetary bail for misdemeanors and some low-level felonies or introducing risk assessment tools into the bail/pretrial decision-making process (Jorgenson & Smith, 2021). The goal of these reform efforts is to limit the number of individuals subjected to pretrial detention who would otherwise appear for their day in court without posing a threat to public safety. These reform efforts have gained in popularity over the past decades due to the existing research highlighting the negative consequences of pretrial detention and the exorbitant costs of detaining hundreds of thousands across the country daily prior to a determination of guilt.

Research has found consistent evidence of the negative impact of pretrial detainment on later criminal justice system outcomes (Dobbie et al., 2018; Kutateladze et al., 2014; Wooldredge et al., 2015) as well as an increased likelihood of future involvement with the criminal justice system (Lowenkamp et al., 2013). Furthermore, the costs of detaining individuals pretrial are myriad, costing both governments and families upwards of $13.6 billion per year (Rabuy, 2017). Additionally, research has found racial and ethnic disparities in pretrial decisions (Demuth, 2003; Demuth & Steffensmeier, 2004; Schlesigner, 2007) and that inequalities in sentencing practices can be partially explained by racial differences in pretrial detention (Martinez, Peterson, & Omori, 2020; Omori & Peterson, 2020). For example, using data from Miami-Dade County, Martinez et al.
(2020:848-9) find that "while bond amount increases pretrial detention time for all defendants, the effect of bond amount on detention time is larger for Black defendants, especially Black Latinxs."

Overview of Pretrial Reform in the United States

Due to the reasons specified above, there has been significant movement over the previous decade to reform pretrial processes across the country. Specifically, many states have begun to either limit or abolish their cash bail system, consider one's ability to pay in the setting of bail, or implement risk assessment programs in making pretrial decisions. Most states that have reformed their pretrial processes have implemented policies that either abolished or reduced the use of cash bail. For instance, in 2017, New Jersey eliminated bail by creating a presumption that individuals charged with a majority of offenses would be released, and decisions should be made using a risk-based decision making-framework. Studies examining these changes found uneven patterns of abolishing cash bail, and prosecutors typically departed from this rule or at least attempted to add additional supervision to an individual's bail (Rengifo et al., 2020). Similarly, in 2018, Philadelphia implemented no cash bail for nearly $\frac{2}{3}$ of cases filed including approximately 25 low-level offenses. However, this bill was discretionary, and judges or magistrates could set bail if they chose. Despite this caveat, research shows that release on own recognizance (ROR) increased by 22%, and the proportion of defendants staying one night in jail decreased by 25% (Ouss & Stevenson, 2021). Furthermore, studies also emphasized that there was no change in the number of failures to appear or the recidivism rate after abolishing cash bail (Ouss & Stevenson, 2019). Moreover, in 2019, New York State (NYS) abolished cash bonds for most misdemeanors and non-violent felonies (Lu & Rempel, 2022). Studies found that pretrial jail populations decreased and that fewer defendants charged with low-level crimes were admitted following the implementation of this reform. However, while the overall population of the jail decreased, racial disparities increased as the non-Hispanic White population decreased significantly more than the Black population (Kim, Hood & Connors, 2021). Together, these reforms limiting the use of cash bail have had varying results, in part depending on the discretionary limits placed on the reforms themselves.

Another area of reform involves introducing legislation or court rules requiring decision-makers to consider the ability of defendants to pay when setting monetary bail amounts. For example, in 2018, Georgia implemented a law that required judges to evaluate the financial ability of the defendant to pay within 48 hours for individuals charged with misdemeanors. While this new law led to around 49 of counties beginning to consider the defendant's ability to pay, there weren't any significant changes in the application of the law. This can be seen in the finding that only three counties had actually implemented systems that guaranteed the release of an indigent defendant within 48 hours of the arrest (Woods et al., 2020).

These studies combined with studies examining more localized bail reform efforts illustrate how bail reform can lead to a decrease in pretrial jail populations and an increase in release of recognizance; however, they also suggest discretionary reforms can lead to uneven patterns in application due to prosecutorial or judicial discretion (Copp et al., 2022). These reforms also generally did not result in threats to public safety (Albright, 2022; Heaton, 2022; Smith, 2022) although there is some tentative evidence of a slight increase in likelihood of failure to appear (Albright, 2022).
Overview of Pretrial Reform in Maryland

Maryland’s current bail system is the major focus of pretrial reforms (see Appendix A for an abbreviated timeline of Maryland pretrial reform efforts). In recent years, bail reform has taken shape in different forms across jurisdictions. At the state level, in 2016, the Attorney General of Maryland, Brian Frosh requested changes be made to Maryland Rule 4-216, outlining bail decision guidelines emphasizing the need for judges to consider a defendant’s ability to pay when setting bail amounts. This request was adopted, and the rule change went into effect on July 1, 2017. Although bail decisions remain largely at the discretion of the District Court Commissioner and judge, the hope was that this rule change would limit the reliance on monetary bail across the state, limiting adverse effects among those unable to pay large bail amounts. Another way that pretrial reform has taken place in Maryland is through the implementation of pretrial risk assessments across many counties in the state, discussed further below. These risk assessments differ widely across jurisdictions but generally take into account current offense information and criminal history in providing additional information to pretrial decision-makers prior to making release and bail decisions. Lastly, another recent method of pretrial reform in the state has been through the actions of individual jurisdiction actors, such as in 2019 when Prince George’s County’s State’s Attorney announced that her office would no longer request cash bail (Bui, 2019).

Together, these reforms demonstrate the desire for more fair practices across the state of Maryland. However, due to the disparate implementation of some of these reforms, namely pretrial risk assessment implementation, there is limited understanding of how these reforms have changed pretrial and bail decision making across the state.

Pretrial Risk Assessments

Increased attention has also been placed on the potential of pretrial risk assessments in decision making (Copp et al., 2022; Lowder et al., 2021). The rationale for these tools is that, after arrest, a risk assessment tool can be used to determine if an individual should be released or detained based on their risk of failing to appear in court and their possibility of committing a new crime. Other states have taken steps to implement a pretrial risk assessment tool statewide (see New Jersey’s implementation of the Public Safety Assessment). Currently, Maryland does not have a statewide, standardized risk assessment tool, but in recent years, more counties have embraced risk assessment programs as an effort to advance bail reform. In 2007, Montgomery County first created a risk assessment instrument based on county-level data and has revalidated the tool periodically since. A similar version of Montgomery County’s risk assessment tool was implemented in St. Mary’s County in 2015. While some counties have created their own tools, others have adopted preexisting tools such as Carroll County who adopted the Public Safety Assessment (PSA) created by Arnold Ventures, described in more detail in the analysis section below. An open records research effort by our research team, combined with attempted outreach to each individual county, concludes that 16 out of Maryland’s 24 jurisdictions have implemented a pretrial-specific risk assessment tool in the last few decades, although it should be noted that we were not able to verify the use of a pretrial risk assessment tool in multiple counties despite an extensive search and attempts to contact each jurisdiction’s pretrial services. Additionally, there was limited open-source information on the timing of a risk assessment tool implementation in multiple counties. The disjointed implementation of differing risk assessment tools across the state of Maryland has likely impacted how pretrial decisions are made across Maryland’s 24 jurisdictions. As found by Lowder and colleagues, the “implementation of pretrial risk assessment tools without a framework to guide decision-making may not result in meaningful reductions in pre-trial populations” (2021, p.10).
Maryland Pretrial Process and Reform Efforts

One aspect of state-level criminal justice research is the unique nature of each state’s system. In Maryland, an individual enters the criminal justice system through an arrest, citation, summons, or warrant. Among those that are arrested, they are taken to a local detention center where they are booked into the system. Typically, within 24 hours there is an initial hearing in front of a District Court Commissioner (DCC), a member of the court who does not qualify as a judge. In this brief hearing, the DCC decides if the individual will be detained pretrial or if they are to be released on their own recognizance or with specific conditions such as monetary bail. If an individual is assigned ROR or if they can meet their bail conditions immediately, they can be released following this initial hearing. For those that are held without bail or held on bail by the DCC and are unable or unwilling to immediately pay the monetary amount, there is a following bail review hearing in front of a District Court judge, who reviews the decision made by the DCC and decides to either maintain the same decision as the DCC or may change the bail decision of the DCC. For example, while a District Court Commissioner may look at a case at an initial hearing and decide the individual is to be held without bail, a District Court judge at the bail review hearing may alter the DCC’s decision and hold the individual on bail and assign a specific monetary amount the individual must pay to be released. After this hearing of the pretrial phase, the case continues through system, with each individual either meeting their bail requirements and securing release or remaining in detention until their case is completed (see Appendix B for a detailed profile of the pretrial process in Maryland).

Research on the pretrial process is relatively limited in Maryland. One of the reports examining these issues studied 2015 and 2017 data in Baltimore City and Prince George's County and found that after a bail reform effort, the percentage of cases released on their own recognizance increased, but the proportion held without bail increased even more (Blaumauer et al., 2018). This report also shows a 33% decrease in the jail population in the first year of implementation. The Black-White disparity in bail amounts, however, increased, which requires further research to fully understand if this disparity resulted from extralegal factors related to the reform. A Study of Bail (2018) report which focused on Prince George’s County’s reform results found evidence of a decline in the use of cash bail in Prince George’s County after bail reform, but also an increase in the percentage of people held without bail.

In a prior project funded by the Maryland Governor’s Office of Crime Prevention, Youth, & Victim Services, the authors of the current report, along with other colleagues conducted a preliminary examination of bail and pretrial decision-making in two test jurisdictions, Baltimore City and Prince George's County using the CLUE data. This project was exploratory in nature but showed that trends in bail outcomes and amounts changed over the study period of 2012 to 2020, with significant changes coinciding with the 2017 court bail rule change in the state (Glazener et al., 2022). Our prior report also details the notable differences between Baltimore City and Prince George’s County, detailing how bail decisions can differ between jurisdictions in the same state, demonstrating the need to examine jurisdictional differences in practices to fully understand the impact of state-wide criminal justice system changes.

These studies suggest that the 2017 Maryland law change was associated with a decreased use of cash bail, but evidence shows the reform may have had the unintended consequence of increasing the number of individuals held without the possibility of bail. From this research, it is unclear whether the law change had a causal impact on the use of cash bail or of the broader impacts on pretrial detention patterns. More information
is needed to support efforts in jurisdictions across the country and within Maryland to effectively reduce the local detention population while protecting public safety.

**Client Legal Utility Engine (CLUE) Data**

The Client Legal Utility Engine (CLUE) data include millions of District Court and Circuit Court cases scraped from Maryland Judiciary Case Search and other websites from the mid-1980s to 2021. The CLUE data were developed by the Maryland Volunteer Lawyers Service (MVLS) to increase ease in access to case records for legal system clients (e.g., expungement opportunities) and researchers (e.g., case processing). Whereas the CLUE website allows for easy retrieval of individual case data, leveraging the data for scientific analysis involves a number of steps to link, clean, and code variables. The database that we obtained from MLVS contained over 40 million rows of records.

For the current project, we set out to extract all the disparate data files from CLUE, clean and flatten the files to the case-level, and merge the files together to create a case-level analysis file capable of examining a variety of criminal court research questions, with a focus on understanding and analyzing pretrial bail and detention processes. Additionally, we used probabilistic record linkage to identify unique individuals from the case file to allow for the identification of the same individuals across multiple cases across the state. Expanding on prior work examining Baltimore City and Prince George’s County, the current project utilized data from all counties in the state. We describe the stages of extracting, cleaning, coding, merging and restricting the CLUE dataset in the following sections.

**Data Extraction, Cleaning, Restructuring, & Merging**

The first stage of creating the analysis file for the current study was to parse text fields scraped by MVLS. The original data contained a single table with some basic descriptive information about the case such as the time that case was scraped and the type of case (i.e. criminal, warrant, etc.) and a column labeled “misc” which contained all additional information such as charge and description information, event history information, and more detailed defendant information. We extracted all possible information from this “misc” variable into individual tables, resulting in about 20 tables for each year and each jurisdiction in addition to the original table containing the basic descriptive information.

To be able to link information across individual data tables, each table was first cleaned and documented to identify the relevant information for the current study. Each table in its original form was at a different level of analysis. For example, the charge and description information table contained a row for every individual charge with a wide range of information related to that particular charge such as the charge description, the disposition for that particular charge, and any related sentencing information. In contrast, the bail table contained a row for every bail event in the data with information on the date of each bail event, the type of bail event, and any amounts or outcomes associated with that bail event.

It was first necessary to extract all relevant information from each table in its original form prior to restructuring and flattening the data to a charge level event. For example, we first had to identify the necessary variables from the bail table, such as the number of bail events and the outcome for each individual bail event.
prior to flattening the multiple rows of bail events to just one row per court case. In each table, variables related to the pretrial process were identified and recoded to align with the purposes of the study. The resultant table was then restructured and flattened to the case-level, meaning each table contained just one row of information for each court case. Once each table was flattened, it could then be merged into the main analysis file at the case-level.

This process was repeated for all counties. It quickly emerged that jurisdictions differed in how data was reported/stored within CLUE with two separate groups of jurisdictions clustered based on these patterns. The first, which we named “the Big 3” included Baltimore City, Prince George’s County, and Montgomery County, while the remaining counties, referred to below as “the common courts” clustered together in the way the data was organized. Although generally, these two groups of jurisdictions contained the same information, there were some differences in the data structure that led to differences in how the data were coded. For example, the big 3 counties’ bail data specified the type of bail event, such as the initial hearing or the bail review hearing, at which a bail decision was made while the common courts’ bail data only included dates of the bail event without specifying the specific type of bail event that date pertained to. For this specific example, we had to rely on our understanding of the Maryland bail system and assume the first bail data for an individual case was the initial hearing and a subsequent bail event date was identified as the bail review hearing for all common court cases with bail information. The analysis file contains data for all cases identified as “criminal” in the CLUE database.

Quality Assurance Checks

To gain understanding and confidence in the CLUE dataset, we set out to conduct two unique quality assurance checks: 1) Case Harvester, and 2) Maryland Judiciary “Impact of Changes to Pretrial Release Rules” Report. Due to the nature of the scrapped CLUE data file, it’s possible certain types of cases were systematically undercounted or certain types of offenses were missed by the parser. Below, we detail the attempts made to conduct quality assurance checks of the CLUE data and the conclusions drawn from these analyses.

Case Harvester

The first area of quality assurance checks compared the data in CLUE to another source of scrapped Maryland Judiciary Case Search data known as Case Harvester (https://github.com/dismantl/CaseHarvester). Case Harvester is a project operated by Open Justice Baltimore to provide more readily accessible data on Maryland criminal cases. Unlike the CLUE data, the Case Harvester data do not include personally identifiable information which limits its ability to track individuals over time and across jurisdictions. As both Case Harvester and CLUE use scraped records from the same original source, we would expect them to produce the same information for individual case filings.
Figure 1 above shows the overlap in case filings between the CLUE and Case Harvester datasets from 2012-2021 across the state of Maryland.\(^1\) The red dots indicate the percentage of cases reported in Case Harvester that are not present in the CLUE dataset and the blue dots are indicative of the percentage of cases reported by CLUE that are not present in Case Harvester. When the dots overlap, it means there is a strong correspondence between the two data sources.

For ease of analysis and display of results, throughout the report, we disaggregate the “common courts” by population size (small, medium, and large) as well as focus on the three largest counties (i.e., “the Big 3”- Baltimore City, Prince George’s County and Montgomery County). Additionally, some results in the quality assurance analyses displayed below demonstrate differences in how CLUE captures data based on size of the

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\(^1\) Although the CLUE dataset contains scrapped data back to the 1980s in some instances, coverage is missing for one county or another until 2012. Additionally, beginning in October of 2021, MVLS was no longer able to scrape Case Search records due to new barriers put in place to limit scraping abilities. Thus, the only data available for analysis across the state is from 2012 through 2021.
jurisdiction. As seen in Figure 1, in general, there is a strong level of overlap/correspondence between the two data sources particularly for the years 2013 to 2019. This quality assurance check informed our focus on these years for all analyses, as these are the years that we are the most confident in completeness of the CLUE data.

Additional trends in the figure warrant attention. First, as can be seen across all four county divisions, the CLUE dataset is capturing a greater population of court cases relative to what is reported in Case Harvester, leading support to the use of the CLUE dataset over the Case Harvester dataset. It’s possible differing definitions of what constitutes a criminal case filing led to these differences across the two datasets, or the scrapping tool used by Case Harvester is capturing a smaller population of all case filings in Maryland. Second, we observe an increase in missingness in the CLUE dataset beginning in 2020. It appears that a larger percentage of cases that exist in Case Harvester are not present in CLUE in 2020, particularly in Baltimore City, Prince George’s County, and Montgomery County (“the Big 3”). Additionally, in 2012 there were significant issues of missingness in the CLUE dataset, particularly in the first four months of the year. Further exploration is needed to understand why the CLUE dataset would not contain the same case information as what is present in CLUE, particularly in 2020.

Maryland Judiciary “Impact of Changes to Pretrial Release Rules” Report

Following the bail rule change in Maryland sparked by the opinion of the Office of the Maryland Attorney General in 2016 (discussed above), the Maryland Judiciary issued a report examining the impact bail outcomes across the state from July 2016 through September 2017. We used some of the statistics produced by this report to compare the bail information in CLUE relative to that provided by the judiciary over the study period covered by the report. As the statistics produced in the Maryland Judiciary report should be the from the state’s records themselves, they provide an ideal benchmark by which to compare bail data in CLUE.

Figure 2. Big 3 Number of Initial Hearings

Figures 2 through 5 show the comparisons between the CLUE data and the Maryland Judiciary Report for both the total number of initial hearings and the number of initial hearings that resulted in a ruling of held on bail. The comparisons are restricted to the period covered in the Maryland Judiciary report of July 2016.
through September 2017. When dots are closer to the dotted trend line it indicates a greater degree of overlap/correspondence between the CLUE and the Maryland Judiciary Report. When dots fall above the line it means there are a greater number of cases reported in the Maryland Judiciary Report; when dots fall below the line it means there are a greater number of cases picked up in the CLUE data. The dots are color coded such that red = Baltimore City, green = Montgomery County, and blue = Prince George’s County.

These figures give an idea of how the information from these two datasets overlap, particularly between those counties identified as the Big 3 and the remaining 21 jurisdictions. The Maryland Judiciary report produced a large number of statistics that we can compare with the CLUE data and the full output for these comparisons are shown in Appendix C. Figure 2 above shows the overlap between the Maryland Judiciary report’s number of reported initial hearings from July 2016 through September 2017 compared to number of initial hearings reported by CLUE for the three largest jurisdictions in the state. As seen in this figure, the number of cases reported by each of these sources is similar, with the CLUE data slightly overcounting the number of initial hearings relative to the judiciary, particularly in Montgomery and Prince George’s Counties. The overlap between these sources lends confidence in the information reported by the CLUE dataset.

**Figure 3. Common Court Number of Initial Hearings**

![Figure 3. Common Court Number of Initial Hearings](image)

Figure 3 above shows the overlap between the Maryland Judiciary report’s number of reported initial hearings from July 2016 through September 2017 compared to number of initial hearings reported by CLUE for Maryland’s remaining 21 jurisdictions, divided into three categories based on population. Similar to what was seen in Figure 2, the CLUE data are slightly overcounting the number of initial hearings in the remaining Maryland jurisdictions.
In addition to just comparing raw counts of the number of initial hearings in each county, the judiciary report also produced information on the outcomes of these hearings, allowing us to get a more nuanced idea of the pretrial data provided by the CLUE dataset. Figure 4 shows the number of initial hearings resulting in a ruling of held on bail in the “Big 3” counties. This figure demonstrates that the CLUE data is providing very similar information to that provided by the Maryland Judiciary report, lending confidence to how the CLUE data coded bail outcomes among these counties.

**Figure 4. Big 3 Number of Held on Bail (HDOB) Decisions at Initial Hearing**

**Figure 5. Common Court Number of Held on Bail (HDOB) Decisions at Initial Hearing**
Figure 5 above shows the number of initial hearings resulting in a ruling of held on bail in the remaining 21 jurisdictions in Maryland, divided into population clusters. As can be seen here, this graph demonstrates one of the important reasons for differentiating between different jurisdictions in understanding how the CLUE data contains information. It appears that the CLUE data is largely overcounting the number of initial hearings resulting in a setting of monetary bail in counties with a population of less than 300,000. Counties with more than 300,000 have data in CLUE that more closely resembles that produced by the Maryland Judiciary report. These findings, along with the remaining graphs displayed in Appendix C, lend more confidence to the CLUE data as it pertains to the larger counties in the state.

The quality assurance tests above lend support to the use of the CLUE data to examine criminal justice outcomes across the state. Namely, the data provided by CLUE closely map onto other sources of court data in the state. However, comparisons with Case Harvester highlighted some issues of missingness in particular years of CLUE’s data, contributing to our decision to focus analyses on the years 2013 through 2019. Additionally, quality assurance checks against a Maryland Judiciary report highlight some issues of CLUE data overcounting cases and case outcomes in the smaller jurisdictions in the state (see Figure 5 for example). The potential reasons for why the CLUE dataset would not be as accurately providing data for the smaller counties in the state require further attention.
Exploratory Analysis of Pretrial Outcomes

As with our prior report, our exploratory analysis of pretrial outcomes focuses on two bail events, the initial hearing and the bail review hearing. At each of these bail events, a bail type is set and, if applicable, a bail amount. Given the differences in jurisdictions across Maryland, for ease of visual representation of the data, each analysis is presented in two separate graphs, one for what we have labeled the “big 3” jurisdictions (Baltimore City, Prince George’s County, and Montgomery County) and a separate graph for the remaining 21 jurisdictions, divided up into three distinct categories based on Census population data for each jurisdiction.

The distribution of the remaining counties is as follows: less than 100,000 population (Allegheny, Calvert, Caroline, Dorchester, Garret, Kent, Queen Anne, Somerset, Talbot, Worcester); more than 100,000 but less than 300,000 (Carroll, Cecil, Charles, Frederick, Harford, Saint Mary, Washington, Wicomico); more than 300,000 (Baltimore, Anne Arundel, Howard). This allows us to examine the unique trends of the state’s three most populous counties while also examining how the remaining jurisdictions of varying sizes produced varying trends over the study period.

The following descriptive statistics describe outcomes for the two main bail events that take place in the District Court (see Appendix B for more details): 1) the initial hearing in front of the District Court Commissioner (DCC), and 2) the subsequent bail review hearing in front of a District Court judge. The outcomes of interest include:

- **the outcome of the bail event**, indicating whether the defendant in that case received a specific outcome at either the initial hearing or the bail review hearing.
  - There are four potential outcomes for an initial hearing and/or bail review hearing:
    - Held without bail (HWOB) in which the individual is detained in custody without the possibility of release prior to the settling of their case.
    - Held on bail (HDOB) in which the individual is assigned a monetary bail amount that if paid secures their release from custody prior to the settling of their case. The defendant forfeits the monetary bail amount if they fail to appear or commit an additional crime before the finalizing of their case.
    - Unsecured personal bond (UPB) in which the individual is assigned a monetary bail amount, but they are released from custody prior to the settling of their case without having to pay that monetary amount. The defendant is held liable for the monetary amount set if they fail to appear or commit an additional crime before the current case is settled.
    - Release on own recognizance (ROR) in which the individual is released from custody on their own assurances of return for subsequent court dates. ROR does not require any monetary value to be paid and the individual is not liable for a monetary amount at any point in the process.

- **the amount of bail** set at either the initial hearing or the bail review.

- **the demographic composition of cases**.
Figure 6 displays bail outcomes at the initial hearing for Baltimore City, Prince George’s County, and Montgomery County. Each bail event can result in an outcome of held on bail (HDOB), held without bail (HWOB), release on own recognizance (ROR), or an unsecured personal bond (UPB). As can be seen in Figure 6, the distribution of bail outcomes at the initial hearing shifted drastically over the study period. One of the main trends that can be seen across all three of the largest Maryland counties is the drop in the outcome of held on bail, particularly in 2016 and 2017, in line with the Maryland court rule change. At the same time, there was an increase in the share of initial hearings resulting in the individual being held without bail, with the share of all hearings resulting in being held without a possibility of bail more than doubling across all three counties across the study period. Another notable trend is the increase in the outcome of unsecured personal bonds, particularly in Baltimore City and Montgomery County. It appears that one way these counties have approached bail reform is by increasing the percentage of the offender population who are assigned a bail amount but are released from custody without having to pay a monetary amount, but being liable for that amount if they failed to appear or committed an additional offense following release. There was not a similar distinguishable difference in ROR surrounding the 2017 decision.
Figure 7 displays bail outcomes at the initial hearing for the remaining 21 jurisdictions in the state, divided into population clusters. All three population groups show a large decline in the share of initial hearings that resulted in a held on bail outcome between coinciding with the 2017 bail rule change, a decline that continuing through the end of the study period. These counties also saw a slight uptick in the share of initial hearings resulting in a release on recognizance and unsecured personal bond. However, there is also a large increase in those that were held without bond, showing similar results to those of the Big 3 counties. These results seem to point to the possibility that court decision makers reacted to the court rule change by both increasing the share of those that were given no conditions for release and by increasing the share of those who were not given the possibility of release at all.
Figure 8 displays the average bail amounts at the initial hearing for Baltimore City, Prince George’s County, and Montgomery County. To limit the impact of typos or extreme outliers, the average bail amount graphs do not include the upper 5th percentile of the distributions. As seen in the graph, the average bail amounts for all three counties fell over the study period, with a large drop following the announcement of the court rule change in 2016. The changes in bail amount are particularly stark in Baltimore City, which had an average bail amount substantially higher than the other two counties throughout the study period.
Figure 9 displays the average bail amounts at the initial hearing for the remaining 21 Maryland jurisdictions. As seen in the graph, and similarly to what was seen with the Big 3 counties, the average bail amounts for all three population categories of counties fell over the study period, with a large drop following the announcement of the court rule change in 2016. It is important to note the difference in the y axis between Figures 8 and 9, highlighting that the average bail amounts among the smaller counties were generally less than that of Baltimore City shown in Figure 8. These results in conjunction with Figure 8 seem to point to the possibility that court decision makers decreased the monetary bail amounts they were setting in response to the rule change requesting they consider an individual's ability to pay.
Figure 10 displays bail outcomes at the bail review hearing for Baltimore City, Prince George's County, and Montgomery County. As with the initial hearing, the bail review hearing can result in an outcome of held on bail (HDOB), held without bail (HWOB), release on own recognizance (ROR), or an unsecured personal bond (UPB). Figure 10 shows similar findings to Figure 6 which displayed the outcomes for the initial hearing. Across the Big 3 jurisdictions, held without bail decreased over the study period, and the share of held without bail increased. It’s interesting to note how differing counties handle bail decisions. Figure 10 shows that Montgomery County relies on unsecured personal bonds at a much higher rate than the other counties, potentially using UPB as a mechanism for release similar to the idea of release on own recognizance.
Figure 11 displays bail outcomes at the bail review hearing for the 21 smaller Maryland jurisdictions. Figure 11 shows similar trends to those described above, a large decrease in the share of bail review hearings resulted in an outcome of held on bail over the study period, particularly during 2016 and an opposite trend in held without bail. In the common courts, there’s not much of a discernable trend in release on recognizance over the study period, although among counties with population larger than 300,000 there is a steady increase in the use of ROR from 2013 through 2019.
Figure 12 displays the average bail amounts at the bail review hearing for Baltimore City, Prince George's County, and Montgomery County. Compared to those at the initial hearing, the average bail amounts are significantly higher at the bail review hearing, indicating that judges may place more value in larger monetary bail amounts relative to the District Court Commissioners setting amounts at the initial hearing. As seen in the initial hearing average bail amounts, the average bail amount at the bail review hearing decreases over the study period, mainly in line with the 2016/2017 bail rule change.
Figure 13 displays the average bail amounts at the bail review hearing for the remaining 21 Maryland jurisdictions. Compared to those at the initial hearing, the average bail amounts are significantly higher at the bail review hearing among counties with less than 300,000 population, indicating that judges may place more value in larger monetary bail amounts. As seen in the initial hearing average bail amounts, the average bail amount at the bail review hearing decreases over the study period, mainly in line with the 2016/2017 bail rule change. This figure shows that by mid-2018, the average bail amounts in these counties was less than $10,000.

Pretrial Outcomes by Demographics (Sex and Race)

The following descriptive statistics provide a breakdown of the bail decisions described above by both sex and race.
Figure 14 above breaks out initial hearing outcomes by sex of the defendant. The first row combines the Big 3 counties, and the second row combines the common courts. The red bars represent data prior to the bail rule change and the blue bars represent data after the rule change. As can be seen regardless of time period, there were substantial differences in initial hearing decisions between males and females. Females had a lower likelihood of being held on bail and held without bail but had a higher likelihood of being released on their own recognizance. These patterns hold true in both the 2013-2016 period and the 2017-2019 period, although the difference is not as large for those held on bail after the bail rule change. Figure 14 shows that, at least at face value, females are on the receiving end of more lenient initial hearing rulings relative to males.
Figure 15 above breaks out initial hearing outcomes by race of the defendant. There is no ethnicity measure in the CLUE data, thus restricting our racial analyses to the categories of Black, White, and Missing/Other. The first row combines the Big 3 counties, and the second row combines the common courts, and the columns show initial hearing outcomes broken out by time period. This allows for easy comparison across racial groups before and after the bail rule change. As can be seen in Figure 15, all racial groups experienced significant shifts in initial outcomes before and after the bail rule change, with large decreases across the groups in being held on bail and large increases in being held without bail. For example, in the Big 3 counties, the share of initial hearings resulting in a held without bail ruling dropped from about 48% to 22% among Black defendants, from 45% down to 24% for White defendants, and from 50% to 20% among those with other or missing racial categories. However, there are some slight differences between racial groups in decisions after the bail rule change. In both the Big 3 and common courts, White defendants had a lower likelihood of being held without bail relative to Black defendants, and White defendants had higher likelihoods of release on own recognizance, although it should be noted that these differences are small. Further analysis should be conducted to understand the differences initial hearing decisions between racial groups.
Probabilistic Record Linkage

The results presented in the previous section demonstrate a strong correlation between court events measured through scraped CLUE data and non-CLUE measures of court activity. This indicates that CLUE data can be effectively used to measure event counts at specific points in time. This information can be valuable for generating statistics, such as:

- The count of cases where the defendant was released on recognizance over time.
- The average bail amount across counties.

However, certain other statistics, like the percentage of defendants rearrested within a year or the number of defendants with pending cases, require identifying records that refer to the same person. Although the records scraped from Maryland Case Search lack unique identifiers for defendants, making direct linking across cases challenging, we can still use probabilistic record linkage methods for this purpose.

To do so, we employ an open-source record linkage algorithm, Name Match (https://github.com/urban-labs/namematch). The algorithm takes known instances of record pairs, some referring to the same person and others not, as input. With this "groundtruth" information, the algorithm assesses the similarity between data elements such as name and date of birth across records to create a statistical model for determining if two different records refer to the same person.

To train the record linkage algorithm, we gather training examples by leveraging the fact that in a subset of cases in our data transferred from District to Circuit court, there are discrepancies in the defendant's name or date of birth information between the two records. These cases represent record pairs where we have strong reasons to believe that the records refer to the same person, despite the differences in name and/or date of birth. We utilize this groundtruth data of known records that do and do not refer to the same person to train the record linkage model.

Pretrial Risk and Outcomes

There has been a growing movement to employ statistical decision aids to help assess the risk of pretrial violations, also known as pretrial risk assessments. There are at least two risk-based prerequisites for determining whether such tools would be useful in Maryland. The first is to demonstrate whether pretrial rearrest can be forecasted with some level of accuracy. The second is whether that level of accuracy is higher than that of decision makers in the system currently making pretrial decisions (District Court Commissioners and District Court judges).

Predicting Rearrest for a Violent Charge

In this section we examine the predictability of pretrial risk for violent rearrest in Maryland. To do so, we score each defendant on an off-the-shelf pretrial risk assessment that is widely used in a number of jurisdictions across the country. The off-the-shelf tool we employ is the New Violent Criminal Activity (NVCA) scale which is part of the Public Safety Assessment (PSA). The PSA is a pretrial risk assessment developed by Arnold Ventures and has been adopted in jurisdictions across the country, such as the state of New Jersey in 2017 (Anderson et al., 2019), and Carroll County in Maryland. It contains three scales that predict, respectively, any new arrest, failure to appear, and a new arrest involving a violent charge. Table 1 below lists the factors and associated
points for the NVCA. If a defendant scores 4 or more points, then they will be forecasted to be at elevated risk of a rearrest with a violent charge. To illustrate how the scoring works, imagine that a 20-year-old defendant was arrested for a non-violent charge (0 points), but had a pending case at the time of the arrest (1 point), and had three prior violent convictions (2 points). This defendant would receive a score of 3 and not be forecasted to be at elevated risk. If this defendant had instead been charged with a violent offense, then they would receive 2 points, plus an additional point for being 20 years old or younger. The defendant’s total score would increase to 6 and they would receive the NVCA flag.

Table 1. New Violent Criminal Activity (NVCA) Scale

<table>
<thead>
<tr>
<th>PSA Factor</th>
<th>Response</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current violent offense</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>Current violent offense and 20 years old or younger</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Pending charge at the time of arrest</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Prior conviction (misdemeanor or felony)</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>Prior violent conviction</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes, 1 or 2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Yes, 3 or more</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 1 From https://advancingpretrial.org/psa/factors/

Figure 16 below shows the predictive performance of the NVCA if it was applied to the Maryland CLUE data.2 Table 2 additionally shows the share of defendants receiving each score, as well as the share by each score who, respectively have a current violent charge, have a current felony charge, received HDOB, or received HWOB at the initial hearing. Figure 16 shows a strong relationship between NVCA score and one-year violent rearrest likelihood. For example, a defendant with a score of 0 is rearrested for a violent crime 7% of the time in the subsequent year, while a defendant with a score of 5 is rearrested for a violent crime at a rate which is more

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2 Due to the time period of our data, the prior conviction factors have a lookback period of four years. We also evaluate predictive performance in the report on our measure of whether a defendant was detained for more than 25 percent of their pretrial period. This was measured by computing the number of days between the filing date and the release date divided by the number of days between the filing date and the case end date (which was taken as the maximum of the plea, verdict, or disposition dates).
than ten times higher at 78%. Table 2 shows that the NVCA would have flagged 5.1% of defendants (those with a combined 4 or 5 on the scale). We also see from Table 2 that there is a high correlation between the current case having a violent charge and NVCA score, going from 0 percent with a violent charge with those with a score of 0 to 100 percent for those with a score of 5. A similar but more muted relationship exists for those with a current felony charge.

**Figure 16. Predictive Performance of NVCA on Violent Rearrest at 1 Year**

<table>
<thead>
<tr>
<th>NVCA SCORE (FLAG STATUS)</th>
<th>ONE-YEAR VIOLENT REARREST RATE</th>
<th>SHARE OF DEFENDANTS</th>
<th>SHARE WITH CURRENT CHARGE VIOLENT</th>
<th>SHARE WITH CURRENT CHARGE FELONY</th>
<th>SHARE WITH HDDB</th>
<th>SHARE WITH HWOB</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (NO)</td>
<td>0.071</td>
<td>0.374</td>
<td>0</td>
<td>0.319</td>
<td>0.247</td>
<td>0.139</td>
</tr>
<tr>
<td>1 (NO)</td>
<td>0.138</td>
<td>0.202</td>
<td>0.000</td>
<td>0.37</td>
<td>0.314</td>
<td>0.171</td>
</tr>
<tr>
<td>2 (NO)</td>
<td>0.31</td>
<td>0.274</td>
<td>0.589</td>
<td>0.404</td>
<td>0.372</td>
<td>0.229</td>
</tr>
<tr>
<td>3 (NO)</td>
<td>0.518</td>
<td>0.098</td>
<td>0.805</td>
<td>0.543</td>
<td>0.383</td>
<td>0.332</td>
</tr>
<tr>
<td>4 (YES)</td>
<td>0.612</td>
<td>0.040</td>
<td>0.832</td>
<td>0.589</td>
<td>0.396</td>
<td>0.391</td>
</tr>
<tr>
<td>5 (YES)</td>
<td>0.779</td>
<td>0.011</td>
<td>1.000</td>
<td>0.601</td>
<td>0.385</td>
<td>0.472</td>
</tr>
</tbody>
</table>
We next examine whether the NVCA applied in Maryland would produce disparate impacts by race. Figure 17 below breaks out Figure 16 by race, where we limit the sample to those with a recorded race of either Black or White. A common definition of fairness is known as calibration which is whether two defendants from different groups (e.g., race, gender, etc.) who have the same risk score reoffend at similar rates. Figure 17 shows that for most NVCA scores, Black defendants are more likely than White defendants to have a rearrest with a violent charge. We note however that despite the miscalibration for most risk scores, there are no unflagged groups that have a higher rearrest rate than flagged groups, an important consideration when assessing the performance of risk assessment. For example, even though Black defendants with a score of 3 have a higher violent rearrest rate than White defendants with the same score, it is still the case that defendants with a score of 4, who are flagged, have a higher rearrest rate than Black defendants with a score of 3.

**Figure 17. Predictive Performance of NVCA on Violent Rearrest at 1 Year by Race**

![Graph showing predictive performance of NVCA on violent rearrest at 1 year by race.](image)

The third and fourth columns in Table 3 below show another commonly used fairness metric, called demographic parity, which shows the percentage of defendants by race that were assigned each score by the NVCA model. For example, we see that 20.2% of Black defendants received a score of 1 as did a similar share of White defendants (21.0%). Loosely stated, an algorithm can be considered fair on this measure if the share of different groups being flagged is similar. Here we see that the NVCA would flag 4.4% + 1.3% = 5.7% of Black defendants and 3.5% + 0.9% = 4.4% of White defendants.

The fifth and sixth columns of Table 3 show the share of defendants in each score bin that were held on bond by race. The seventh and eighth show the share of defendants in each score bin that were held without bond by race. Black defendants are generally more likely to receive HDOB whereas flagged White defendants are more likely to receive HDOB. Finally, Black defendants are more likely to be held without bail (HWOB) or HDOB for most risk scores.
Table 3. NCV A Score and Outcomes by Race

<table>
<thead>
<tr>
<th>NVCA SCORE</th>
<th>ONE-YEAR VIOLENT REARREST RATE</th>
<th>SHARE IN BIN</th>
<th>SHARE HDOB</th>
<th>SHARE HWOB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Black</td>
<td>White</td>
<td>Black</td>
<td>White</td>
</tr>
<tr>
<td>0</td>
<td>0.085</td>
<td>0.050</td>
<td>0.377</td>
<td>0.365</td>
</tr>
<tr>
<td>1</td>
<td>0.155</td>
<td>0.111</td>
<td>0.202</td>
<td>0.210</td>
</tr>
<tr>
<td>2</td>
<td>0.324</td>
<td>0.283</td>
<td>0.261</td>
<td>0.290</td>
</tr>
<tr>
<td>3</td>
<td>0.534</td>
<td>0.491</td>
<td>0.103</td>
<td>0.091</td>
</tr>
<tr>
<td>4</td>
<td>0.606</td>
<td>0.631</td>
<td>0.044</td>
<td>0.035</td>
</tr>
<tr>
<td>5</td>
<td>0.799</td>
<td>0.707</td>
<td>0.013</td>
<td>0.009</td>
</tr>
</tbody>
</table>

**Compare Machine Learning Model Trained on CLUE Data to NVCA**

The previous section showed that the NCV A applied to Maryland data from CLUE is likely to produce valid forecasts of one-year violent rearrest risk. However, best practices in the development of risk assessments promote the development of models using data from the same jurisdiction that the risk assessment will be deployed. To that end, in this section we take a first step at examining whether there is information available in Maryland court data that would lead to improved forecasts of violent rearrest relative to an off-the-shelf risk assessment tool.

To build our machine learning model, we created a dataset which included all 322,573 cases (203,595 unique defendants) with an initial hearing in 2016 to 2018. We split these cases into five folds, ensuring that the same defendant did not appear in different folds. We additionally did not train on the 25% of cases where the defendant was detained during the pretrial period. We then performed nested cross-validation to generate out-of-sample predictions for each case. To do so, we held out each fold one at a time, and then with the four remaining folds, identified the best model using 5-fold cross validation.

Our ML model was built using a technique known as gradient-boosting and incorporated various features derived from defendant data in Maryland court records. The features used in our model included information on a defendant's prior convictions, current case details, and pending cases. For instance, we considered the count of convictions by type in specific time frames, such as the past 30 days, 90 days, one year, and four years. These conviction types encompassed categories like felony/non-felony status, firearm-related offenses, property crimes, public order offenses, and violent crimes. Additionally, we took into account the number of pending cases for each defendant.

In order to compare the predictive performance of our machine learning (ML) model to the NCV A, we first sort defendants by their forecasted risk of one-year violent rearrest based on the ML model. These defendants are ranked from highest risk to lowest risk. We then group defendants into bins of the same size as the NCV A bins. Finally, we compute the one-year violent rearrest rate for each bin and compare it to the NCV A in Figure 18. We see that the rearrest rate is higher for defendants flagged as high risk by the ML model indicating that there is room for improvement in the assessment of risk for violent rearrest. For the NCV A model, 65% of flagged defendants (those with a score of 4 or 5) are rearrested in the next year. For the ML model, this figure goes up to 75%. We also see that defendants that were not flagged by the ML model have lower rearrest risk (18%) than defendants not flagged by the NCV A (20%).
When turning to calibration by racial group, we see that the machine learning model, while not perfect, has improved calibration as compared with the NVCA. Figure 19 below breaks out the machine learning model performance by defendant race. The differences in rearrest rate by risk score is more muted when comparing the ML model to the NVCA, particularly in the higher risk bins.

**Figure 18. Comparing Machine Learning and NCVA for Violent Rearrest at 1 Year**

**Figure 19. Comparing Machine Learning and NCVA for Violent Rearrest at 1 Year by Race**
In this section, we employ our constructed dataset to analyze decision-making around the time of the rule 2017 rule-change. Figure 20 below shows how decision making changed between 2016 and the end of 2018 broken out by the predicted risk of the defendant. To construct the figure, defendants were binned into quintiles of forecasted risk for an arrest with violent change in the one year after the initial filing date of their case. The risk predictions were generated by training a machine learning model (random forest) to predict violent rearrest using information from the current case, demographic attributes of the defendant, and the defendant's prior arrest history. The three rows in Figure 20 represent a different initial hearing outcome. (We do not include UPBs in this analysis due to data quality limitations in smaller counties). In each plot in Figure 20, the x-axis represents a month and the y-axis shows the share of defendants with a particular initial hearing outcome. The first vertical line in each plot is the date (2016-10-25) the letter was released by Attorney General Frosh requesting changes be made to Maryland Rule 4-216 and the second vertical line indicates the date of implementation for the rule change (2017-07-01).

We see from the first row that there was a general decline in the rate of defendants receiving HDOB over the three-year period from the start of 2016 to the end of 2018. Prior to the letter release, we see a strong correlation between the forecasted violent rearrest risk for defendants and the share of them that receive HDOB. For example, among the bottom 20 percent in risk, the share receiving HDOB was close to 30%, while among the top 20 percent in risk the share was closer to 70%. This correlation largely disappears after the implementation of the rule change with both high- and low-risk defendants receiving HDOB at a rate less than 20%. Additionally, we see large sudden drops in the HDOB rate for those with higher forecasted risk around the timing of the letter release as well as the implementation of the rule, with the movements tied to the letter released being of larger magnitude.

We see from the second row that there was a general increase in the rate of defendants being held without bail over the same time period. Prior to the letter release, we see a weak correlation between the forecasted violent rearrest risk for defendants and the share that receive HWOB. For example, among the bottom 20 percent in risk, the share receiving HWOB was close to 5%, while among the top 20 percent in risk the share was closer to 15%. The correlation becomes much stronger after the implementation with low-risk defendants receiving HWOB at a rate of about 15% while high risk defendants received HWOB at a rate of 60%. We again, see large discontinuities, in this case sudden increases, in the HWOB rate for those with higher forecasted risk around the timing of the letter release as well as the implementation of the rule, with the movements tied to the letter released being of larger magnitude. For comparison, we also examine the relationship between forecasted violent rearrest risk and the likelihood of being released on recognizance over the time period. We see that RORs increased overtime for all risk quintiles by between 5 and 10 percentage points. However, the response of RORs to the rule change is much more muted when compared to the movements in HWOB and HDOB.
Figure 20 above provides evidence that DCCs shifted initial hearing outcome decisions from HDOB to HWOB and ROR following the letter and the implementation, with most movements happening from HDOB to HWOB as opposed to HDOB to ROR. The figure also shows that the magnitude of the shifts is highly correlated with future violence risk, suggesting that DCCs were accounting for risk of future violence in their decisions.

We next more formally test the relationship between initial hearing decisions and rearrest risk. We do so by regressing initial hearing outcomes on rearrest risk separately for the time periods before and after the rule change. The regressions control for defendant and case characteristics as well county-level fixed effects. We also explored four types of rearrests: felony, firearm, nonfelony, and violent. These rearrest types were chosen to explore whether the relationship between initial hearing decisions and predicted risk varied by the type of risk being predicted. For example, do commissioners’ decisions align more closely with risk of more serious felony rearrests or less serious nonfelony rearrests. The forecast of these different types of rearrest was estimated using the model building procedure described above separately for the four types of rearrest.

In Figure 21, each row represents an initial hearing outcome and each column represents the predicted risk of each of the four rearrest types. In each row, the bars show how much commissioner decisions change with changes in predicted risk of rearrest (of different types). The blue bars show the relationship prior to the letter while the green bars show the relationship for the period after rule implementation. For example, the

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3 Demographic controls include race, sex, and age. Current case characteristics include current charge class and offense type.
fourth set of bars in the second row show the relationship between risk of violent rearrest and the likelihood that a defendant will be held without bond. Prior to the letter release, going from a zero percent chance of violent rearrest to a 100 percent chance increased the probability of HWOB by about 20 percentage points (blue bar). After the implementation, the association became much stronger, where the same increase in risk of violent rearrest was now associated with about a 63 percentage point increase (green bar) of being held without bond.

**Figure 21. Relationship between Initial Hearing Outcomes and Risk of Rearrest**

We see from the first row (HDOB outcomes) that:

- For felony rearrest:
  - Prior to the letter, the chance of HDOB increased by 40 percentage points when comparing defendants at high- versus low-risk of felony rearrest.
  - After the implementation, the difference in HDOB rate between high- and low-risk defendants for felony rearrest fell by half to 20 percentage points.

- For firearm rearrest:
  - Prior to the letter, the chance of HDOB was largely the same between those at low and high-risk of firearm rearrest.
  - After the implementation, defendants at high risk of firearm rearrest had a lower likelihood of HDOB than those at low risk of firearm rearrest.

- For nonfelony rearrest:
  - Prior to the letter, the chance of HDOB was 32 percentage points higher for those at high risk of nonfelony rearrest versus those at low risk.
  - After the implementation, the difference in HDOB rates fell to 17 percentage points.
• For violent rearrest:
  o Prior to the letter, the chance of HDOB was 23 percentage points higher for those at high risk of violent rearrest versus those at low risk.
  o After the implementation, those at high risk of violent rearrest had a lower likelihood of HDOB than those with low violent rearrest risk. The difference in HDOB rates fell by 38 percentage points.

We see from the second row (HWOB outcomes) that:

• For felony rearrest:
  o Prior to the letter, the chance of HWOB increased by 23 percentage points when comparing defendants at high- versus low risk of felony rearrest.
  o After the implementation, the difference in HWOB rate between high- and low-risk defendants for felony rearrest nearly doubled to 43 percentage points.

• For firearm rearrest:
  o Prior to the letter, the chance of HWOB increased by 44 percentage points when comparing defendants at high- versus low risk of firearm rearrest.
  o After the implementation, defendants at high risk of firearm rearrest had a higher likelihood (76 percentage points) of HWOB than those at low risk of firearm rearrest, an increase between the two time periods of 31 percentage points.

• For nonfelony rearrest:
  o Prior to the letter, the chance of HWOB was 9 percentage points higher for those at high risk of nonfelony rearrest versus those at low risk.
  o After the implementation, the difference in HWOB rates increased to 20 percentage points.

• For violent rearrest:
  o Prior to the letter, the chance of HWOB was 17 percentage points higher for those at high risk of violent rearrest versus those at low risk.
  o After the implementation, the difference in HWOB rates increased to 60 percentage points.

The last row shows how different types of rearrest risk aligned with a defendant not receiving ROR. We see from this row that the difference in rates of not being released on recognizance stayed largely the same between high- and low-risk defendants when comparing the period before the letter was released to after implementation.

The trends from Figure 21 reveal that held on bail decisions were less related to all types of rearrest risk after the implementation of the rule, while held without bail decisions become more aligned with rearrest risk. In particular, HWOB decisions became more aligned with more serious types of rearrest risk (felony, firearm, and violent) than less serious types (nonfelony). At the same time, ROR decisions were less responsive to the rule change.

Initial Hearing Decisions and Rearrest Risk

In the previous section we saw that the shifts in the relationship between rearrest risk and initial hearing outcomes occurred primarily between the two most restrictive types of initial hearing outcomes: held on bond and held without bond. In this section we look at how the severity of the current charge is associated with initial hearing outcomes. We combine HDOB and HWOB in this analysis as the evidence from the previous section reveals that the rule change largely caused a shift between those two decisions.
We stress that pretrial decisions are mandated to be based only partially on future risk to the community, therefore a lack of perfect agreement between forecasted risk and human decisions does not necessarily imply that the latter are suboptimal. For example, we show below that even those with very low rearrest risk are not released on recognizance a substantial amount of time. It might be the case that these defendants have a higher likelihood of failing to appear at a future court date, an outcome that we do not consider in this analysis, but which we aim to return to in future work.

In Figure 22 below, the first row shows the share of defendants that received HDOB or HWOB as a function of four different types of forecasted rearrest risk. The relationship is broken out by whether the current charge was serious (blue) or not serious (red). Each figure in the first row shows the relationship between rearrest risk and HDOB/HWOB for four types of rearrest risk, respectively: felony, firearm, nonfelony, and violent. The x-axis in each plot shows the forecasted risk from the machine learning model (described above) while the y-axis shows the share of defendants with HDOB/HWOB for that forecasted risk. Each dot represents a risk percentile. The second row shows the same relationship but when considering RORs.

**Figure 22. Rearrest Risk and Initial Hearing Outcomes by Case Seriousness**

![Graph showing the relationship between rearrest risk and initial hearing outcomes by case seriousness.](image)

We see that there is a stark difference based on current case seriousness such that for the same forecasted risk of rearrest, those with more serious cases are substantially more likely to receive HDOB/HWOB and those with less serious cases are substantially more likely to receive ROR. For example, defendants who
have a serious current case and have a 50 percent chance of being rearrested for a felony in the next year have a 90 percent chance of receiving HDOB/HWOB as compared with a 50 percent chance for defendants who do not have a serious current case. We also see that defendants with very low risk of all types of rearrest still have a substantial chance of not being released on recognizance. For example, defendants without a serious current case and who are in the bottom percentile of felony rearrest risk are not released on recognizance 20 percent of the time.

Finally, we observe a number of regions where initial hearing outcomes are only loosely correlated with forecasted risk. For example, based on the first plot in the second row, for current serious cases the probability of receiving an outcome of ROR declines only slightly even as the forecasted risk of future felony rearrest triples from 25 percent to 75 percent. Similarly, based on the fourth plot in the first row, for current serious cases the probability of HDOB/HWOB is flat as the forecasted risk of violent rearrest moves from 10 percent to 40 percent.

Overall, this analysis suggests that while there is a robust correlation between initial hearing decision making and forecasted risk of rearrest, other factors are likely to account for the probability of being detained during the pretrial period. It may be the case that District Court Commissioners are considering other non-risk related factors (such as the strength of the case), are using other information about risk that is not captured in the court data used to build our prediction models, or are making forecasting errors when assessing the future likelihood of rearrest. We leave it to future work to attempt to disentangle these potential mechanisms.

The analyses produced above demonstrate the capability of the CLUE dataset to answer interesting and valuable questions regarding Maryland criminal justice system policies. Future investment in the CLUE dataset is necessary to ensure this valued dataset does not become obsolete due to the current scraping issues. Continued efforts to examine and understand criminal justice policies within Maryland would be at a significant disadvantage if the necessary effort is not put forth to capitalize on this unique source of data.
References


Appendix A. Timeline of Pretrial Reform Efforts in Maryland

**A BRIEF HISTORY OF MARYLAND PRETRIAL REFORM**

- **JUNE 19, 2000**
  - Pretrial Release Project Advisory Committee formed

- **SEPT. 12, 2001**
  - Pretrial Release Project (MVA Foundation) released its final report

- **OCT. 23, 2003**
  - Chief Judge of the Maryland Court of Appeals creates a Bail System Task force

- **JAN. 1, 2004**
  - Rule 4-210(e) amended to provide that if a judicial officer sets bail at $2,500 or less, a defendant can post a bail bond secured by a corporate surety or a cash deposit of 10% of the full amount

- **FEB. 8, 2013**
  - Requires a pretrial services unit to immediately perform a comprehensive risk assessment in a case that does not involve a crime of violence

- **SEPT. 25, 2013**
  - DeWolfe v. Richmond: Indigent defendants have the right to a public defender or other state-appointed attorney at initial appearance

- **MAY 27, 2014**
  - Governor created a Commission to Reform Maryland’s Pretrial System
FEB. 11, 2015* A bill requiring a commissioner to release certain defendants if their most serious offense is one of the offenses listed in the legislation.

FEB. 11, 2016* A bill is introduced to order the pretrial release of a person on OR, on nonfinancial conditions, or unsecured bond or subject to least restrictive conditions that will reasonably ensure their appearance.

OCT. 25, 2016 Freshman letter requesting the Standing Committee on Rules of Practice and Procedure consider that defendants are not held in pretrial detention solely because they lack the financial resources to post monetary bail.

FEB. 17, 2017 Maryland Court of Appeals issued Rules Order that amended pretrial procedure rules.

JULY 1, 2017 Revised rules go into effect for a pretrial condition of release for defendants.

OCT. 1, 2017 Justice Reinvestment Act was enacted by the Governor's Office of Crime Control and Prevention.

JAN. 25, 2018 Two bills are introduced establishing the Pretrial Services Program Grant Fund to provide grants to counties to establish or improve pretrial services programs.

MAR. 23, 2018 One million dollars is allocated in the Governor's Office of Crime Control and Prevention for pretrial start-up services.

OCT. 1, 2019 Prince George County Prosecutor announced that the office will no longer request cash bail.
Appendix B. A Profile of the Pretrial Process in Maryland

1. Police Contact

The first step of entering the criminal justice system and initiating the pretrial process is police contact. There are two types of police contact: arrest and summons. Two kinds of arrest situations exist: on-site arrest and

Continued in District Court

Transferred to Circuit Court

Continued in District Court
and arrest by a warrant. Despite the differences in circumstances, these two types of arrests follow the same pretrial process. For circumstances where on-site arrest is not applicable, the courts usually determine whether to issue a summons or an arrest warrant based on the State's Attorney's Office's request. The following processes diverge contingent on the type of police contact.

- Go to Pathway 1 if the contact type is ARREST
- Go to Pathway 2 if the contact type is SUMMONS

**Pathway 1 - Arrest**

**2A. First contact with District Court Commissioner (DCC)**

If the suspect is arrested, they are taken before a judicial officer within 24 hours of the arrest, typically a District Court Commissioner (DCC), for an initial appearance. This is the start of the Phase I of Pretrial Release Review. At the initial appearance the defendant is advised of all charged offenses, the defendant's right to counsel, and the right to a preliminary hearing, if applicable. Maryland law states a defendant must be advised of the right to a preliminary hearing if he/she is charged with a felony outside of the jurisdiction of the District Court in which they appear. If the defendant does not request a preliminary hearing within 10 days of the initial appearance, the right to that hearing is waived.

Anytime a defendant is arrested without a warrant, the DCC must determine whether probable cause existed for that arrest. If the DCC determines there was probable cause, the commissioner must then decide if the defendant is eligible for release prior to the trial and under what conditions. DCCs cannot authorize the release of certain types of defendants, such as defendants registered as sex offenders and defendants with specific offenses (e.g., crimes of violence, violation of a protective order, drug kingpin, etc.). Anytime a commissioner denies pretrial release (i.e., registered sex offender, specific offenses defendant), the defendant is entitled to a bail review hearing during which a judge reviews the conditions of release set by the commissioner, and rules whether to continue, amend, or revoke the decision. This judicial review must occur within 24 hours of the DCC decision.

- Go to 3, if the DCC decides to detain the defendant

- Jump to 4, if all conditions are fulfilled:
  - the DCC decides to release the defendant
  - the defendant is eligible for preliminary hearing
  - the defendant does not waive the right to preliminary hearing

- Jump to 5, if all conditions are fulfilled:
  - the DCC decides to release the defendant
  - the defendant is eligible for preliminary hearing
  - the defendant waives the right to preliminary hearing

- Jump to 5, if both conditions are fulfilled:
  - the DCC decides to release the defendant
  - the defendant is not eligible for preliminary hearing
3. Bail review hearing before District Court Judge

This is the *Phase II of Pretrial Release Review*. Anytime a commissioner denies pretrial release, the defendant is entitled to a bail review hearing during which a District Court judge reviews the conditions of release set by the commissioner, and rules whether to continue, amend, or revoke them. In theory, a judge should only call for pretrial detention without bail when there is “clear and convincing evidence” that the defendant poses a significant public safety threat or is unlikely to appear in court for subsequent hearings. In reality, many other factors are considered. If the judge determines that bail is appropriate, they can decide whether the bail should be “unsecured” or “secured.” Unsecured bail requires no money to be paid up front. However, if the defendant fails to appear in court, they then will owe the full amount of the unsecured bail. A secured bail requires money and/or collateral to be posted or paid before the person is released. Regardless of whether the defendant is released, detained, or bailed, they can ask for a preliminary hearing if they are charged with a felony outside of the jurisdiction of the District Court in which they appear. This right can be waived.

- **Go to 4**, if both conditions are fulfilled:
  - the defendant is eligible for preliminary hearing
  - the defendant does not waive the right to preliminary hearing

- **Go to 5**, if both conditions are fulfilled:
  - the defendant is eligible for preliminary hearing
  - the defendant waives the right to preliminary hearing

- **Go to 5**, if the defendant is not eligible for preliminary hearing

4. Preliminary Hearing

A preliminary hearing is held if the District Court determines that probable cause exists to charge the defendant with a crime.

Regardless of whether the defendant is released, detained, or bailed, they can ask for a preliminary hearing if they are charged with a felony outside of the jurisdiction of the District Court in which they appear. This right can be waived. If the court finds no probable cause, charges may be dismissed.

- **Case dismissed**, if the court finds no probable cause
- **Go to 5**, if the court finds probable cause

5. Continued Processing of the Case

In the District Court, criminal cases are terminated in multiple ways. If the case is not dismissed, often it is adjudicated within the District Court. Some cases are forwarded to the Circuit Court under one of the following circumstances: (1) a party to the case is entitled to and requests a jury trial, (2) the initial charges involve serious felonies that fall under the jurisdiction of Circuit Court, or (3) the initial charges do not fall under the jurisdiction of Circuit Court but are altered after arrest in a way that makes the case eligible for Circuit Court. Generally speaking, the Circuit Court handles the more serious criminal cases as well as major civil cases, while the District Court handles misdemeanors, traffic violations, and certain specified felonies.
Pathway 2 - Summons

2B. Preliminary Inquiry

If the suspect is summoned, they are asked to report to the police or to the court as instructed. They then go through Preliminary Inquiry. During preliminary inquiry, the defendant is advised of all charged offenses, the defendant’s right to counsel, and the right to a preliminary hearing, if applicable. Maryland law states a defendant must be advised of the right to a preliminary hearing if they are charged with a felony outside of the jurisdiction of the District Court in which they appear. If the defendant does not request a preliminary hearing within 10 days of the initial appearance, the right to that hearing is waived.

- **Go to 4,** if both conditions are fulfilled:
  - the defendant is eligible for preliminary hearing
  - the defendant does not waive the right to preliminary hearing

- **Jump to 5,** if both conditions are fulfilled:
  - the defendant is eligible for preliminary hearing
  - the defendant waives the right to preliminary hearing

- **Jump to 5,** if the defendant is not eligible for preliminary hearing

4. Preliminary Hearing

A preliminary hearing is held if the District Court determines that probable cause exists to charge the defendant with a crime.

Regardless of whether the defendant is released, detained, or bailed, they can ask for a preliminary hearing if they are charged with a felony outside of the jurisdiction of the District Court in which they appear. This right can be waived. If the court finds no probable cause, charges may be dismissed.

- **Case dismissed,** if the court finds no probable cause
- **Go to 5,** if the court finds probable cause

5. Continued Processing of the Case

In the District Court, criminal cases are terminated in multiple ways. If the case is not dismissed, often it is adjudicated within the District Court. Some cases are forwarded to the Circuit Court, identified as “jury trial prayer”, or identified as a “stet docket.” Cases in District Court designated as a “stet” indicate that that case is inactive for a certain amount of time, typically during which a defendant is completing agreed upon conditions such as community service or anger management classes. If a defendant chooses to “pray a jury trial,” that case is moved to the Circuit Court for a jury trial, as the District Court only handles bench trials. Generally speaking, the Circuit Court handles the more serious criminal cases as well as major civil cases, while the District Court handles misdemeanors, traffic violations, and certain specified felonies.
Appendix C. All Quality Assurance Checks with Maryland Judiciary Report

Big 3 Number of Initial Hearings

![Graph showing the relationship between Court Count and Scraped Count for different counties.]

Common Court Number of Initial Hearings

![Graph showing the relationship between Court Count and Scraped Count for different populations.]
Big 3 Number of HDOB at Initial Hearing

Common Court Number of HDOB at Initial Hearing
Big 3 Number of HWOBs at Initial Hearing

Common Court Number of HWOBs at Initial Hearing
Big 3 Number of RORs at Initial Hearing

Common Court Number of RORs at Initial Hearing
Big 3 Number of UPBs at Initial Hearing

Common Court Number of UPBs at Initial Hearing
Big 3 Number of Bail Review Hearings

Common Court Number of Bail Review Hearings
Big 3 Number of HDOBs at Bail Review Hearing

Common Court Number of HDOBs at Bail Review Hearing
Big 3 Number of HWOBs at Bail Review Hearing

Common Court Number of HWOBs at Bail Review Hearing
Big 3 Number of RORs at Bail Review Hearing

Common Court Number of RORs at Bail Review Hearing
Big 3 Number of UPBs at Bail Review Hearing

Common Court Number of UPBs at Bail Review Hearing