Pretrial Risk Assessment Tool Validation

PRETRIAL PILOT PROGRAM

COUNTY OF ALAMEDA

JULY 2022

JUDICIAL COUNCIL
OF CALIFORNIA

OPERATIONS AND PROGRAMS DIVISION

CRIMINAL JUSTICE SERVICES

<h1 style="text-align:center">Impact of the COVID-19 PANDEMIC on
the Pretrial Pilot Program</h1>

The Budget Act of 2019 requires that Pretrial Pilot Program courts collaborate with local justice system partners to make data available to the Judicial Council as required to measure the outcomes of the pilots. Senate Bill 36 (Hertzberg; Stats. 2019, ch. 589) established tool validation and reporting requirements for pretrial services agencies using a pretrial risk assessment tool; these requirements are mandatory for all pilot projects.

Throughout much of period covered by this report, the United States experienced the COVID-19 global pandemic. On March 4, 2020, Governor Gavin Newsom declared a state of emergency to protect public health and safety, and formalized efforts by the California Department of Public Health, California Health and Human Services Agency, Governor's Office of Emergency Services, and other state agencies and departments to mitigate this public health crisis. On March 19, 2020, orders from the Governor and the California Department of Public Health directed all California residents to stay home except when performing essential jobs or shopping for necessities.

On March 27, 2020, the Governor issued an order that gave the Judicial Council of California and the Chief Justice authority to adopt emergency rules and take other necessary actions to respond to the COVID-19 health and safety crisis. The Judicial Council adopted various emergency measures to support courts in providing essential services while helping to safely reduce jail populations. These measures, together with policies adopted by individual courts in response to the crisis, have impacted the population eligible for participation in the Pretrial Pilot Program.

On April 6, 2020, the Judicial Council adopted a statewide emergency bail schedule that set presumptive bail at $0 for most misdemeanors and lower-level felonies, with specified exceptions, but retained court discretion in setting bail. The emergency rule was intended to safely reduce jail populations and protect justice system personnel and public health while promoting consistency in pretrial release and detention throughout the state. The Judicial Council repealed the emergency bail schedule rule effective June 20, 2020 but encouraged courts to adopt local emergency bail schedules with $0 bail or significantly reduced bail levels to meet their county's public health and safety conditions.

As a result of local criminal justice system policies and the emergency bail schedule, pilot courts observed significant reductions in booking rates and jail populations during this time. Under these temporary emergency policies, many individuals who would otherwise have been eligible for program participation were cited and released in the field or released on $0 bail upon booking without undergoing a risk assessment. Crime and arrest patterns were also likely affected by COVID-19 and shelter-in-place orders. Criminal case dispositions also slowed during this period.

Therefore, the population of program participants is very likely different than would be seen in the absence of the pandemic, both in terms of reduced numbers and composition.

ALAMEDA VPRAI-R VALIDATION INTRODUCTION

SB 36 requires each pretrial services agency that uses a pretrial risk assessment tool to validate the risk assessment tool used by the agency by July 1, 2021, and regularly thereafter. This pretrial risk assessment tool validation report is the second validation of the VPRAI-R tool in Alameda. The study examines data from covering the period from May 12, 2020 to February 3, 2022.

LEGISLATIVE MANDATE

This report fulfills the legislative mandates of the Budget Act of 2019 (Assem. Bill 74; Stats. 2019, ch. 23), and Senate Bill 36 (Sen. Bill 36; Stats. 2019, ch. 589). In AB 74, the Legislature directed the Judicial Council to administer two-year pretrial projects in trial courts. The goals of the Pretrial Pilot Program, as set by the Legislature, are to:

- Increase the safe and efficient pre-arraignment and pretrial release of individuals booked into jail;

\Implement monitoring practices with the least restrictive interventions necessary to enhance public safety and return to court;

- Expand the use and validation of pretrial risk assessment tools that make their factors, weights, and studies publicly available; and
- Assess any disparate impact or bias that may result from the implementation of these programs.

SB 36 requires each pretrial services agency that uses a pretrial risk assessment tool to validate the risk assessment tool used by the agency by July 1, 2021, and regularly thereafter, and to make specified information regarding the tool, including validation studies, publicly available. AB 74 provided funding to the Judicial Council "for costs associated with implementing and evaluating these programs, including, but not limited to "….Assisting the pilot courts in validating their risk assessment tools." This report, in accordance with AB 74 and SB 36, provides information on the validation of the VPRAI-R pretrial risk assessment tools used by Alameda County.

SB 36 requires pretrial risk assessment tools to be validated. SB 36 defines validate as:

> (4) "Validate" means using scientifically accepted methods to measure both of the following:
> (A) The accuracy and reliability of the risk assessment tool in assessing (i) the risk that an assessed person will fail to appear in court as required and (ii) the risk to public safety due to the commission of a new criminal offense if the person is released before the adjudication of the current criminal offense for which they have been charged.
> (B) Any disparate effect or bias in the risk assessment tool based on Gender, Race, or ethnicity.[1]

VALIDATION METHODS

Descriptive statistics are presented, exploring basic features of the data such as demographics and the overall distributions of arrest offenses and adverse outcomes. The distributions of risk scores are shown in groupings of risk level defined by the tool developer.

---

[1] Sen. Bill 36, § 1320.35(b)(4)

A Receiver Operating Characteristic curve (ROC) model has been used to provide the Area Under the Curve (AUC) statistic for each outcome of interest. The outcomes of interest selected to comply with the legislative mandate are:

- Failure to Appear (FTA)
- New arrest
- New filing
- New conviction
- New violent arrest

The AUC value is a single number that represents the ability of the tool to differentiate between individuals at lower or higher risk across the range of the tool. The AUC is calculated for each outcome overall and separately for each gender and race/ethnicity group to examine whether the ability of the tool to differentiate individuals by risk differs by gender or race/ethnicity.

For criminal justice risk assessments, a common metric for evaluating AUC values is derived from Desmarais and Singh (2013),[2] who defined AUC values less than 0.55 as poor, 0.55-0.63 as fair, 0.64-0.70 as good, and 0.71-1.00 as excellent.

The observed rate of adverse outcomes at each score is presented. The pattern of these rates is an indicator of the accuracy of the tool, showing whether risk scores predict monotonic increasing failure rates for each outcome of interest.

Logistic regression is a used to determines whether the risk scores statistically significantly predict the likelihood of each outcome of interest and the differences in outcomes by risk level across gender or race/ethnicity. Statistical significance is a technical term, used in analyses, to indicate that it is very unlikely that a result or difference occurred by chance. Statistical significance does not necessarily specify the size of the result or difference.

To measure any predictive bias in the tools, fitted curves of the rates of adverse outcomes at each score are shown separately by gender and race/ethnicity groups. Logistic regression tested whether the likelihood of each outcome of interest by risk level differs statistically significantly across gender or race/ethnicity groups.

The risk scores presented in this report are calculated using a scoring scheme designed by the tool developers. The tool considers aspects of an individual's criminal history, current criminal offense, history of failures to appear in court, age, and other factors (see Appendix A, Tables 1 and 2 for the factors and weights specific to the VPRAI-R). Gender and race are not used to calculate risk scores.

This report solely analyses risk scores and associated outcomes for individuals who were released from custody pretrial. Individuals may have been released in a variety of ways by the Sheriff or judge,

---

[2] Desmarais, S. L., & Singh, J. P. (2013). Risk assessment instruments validated and implemented in correctional settings in the United States. *Lexington, KY: Council of State Governments*.

including on bail. This report does not look at judicial decision-making or judges' use of the risk assessment tool.

Further research is needed to analyze the elements that may be driving the observed differences and whether there are data-driven modifications to the tools' risk factors or weights that can further improve the predictive power of the tool.

DEFINITIONS

- **Pretrial period** starts at the booking of an individual at the jail and ends at the resolution of any and all cases associated with that booking.
- **Failure to appear** (FTA) is measured using court records documenting the issuance of a bench warrant for FTA during the pretrial period.
- **New arrest** is any new arrest during the pretrial period reported to the California Department of Justice (CA DOJ) or a new booking within county recorded by the jail.[3]
- **New filing** is any new arrest during the pretrial period that results in charges filed with the court and reported to the CA DOJ.[4]
- **New conviction** is any new arrest during the pretrial period that results in a conviction reported to the CA DOJ during the data collection period.[5]
- **New violent arrest** is any new arrest during the pretrial period for an offense on the list of Pretrial Pilot consensus PSA violent offense list, which includes felonies and misdemeanors of a violent nature. For the full list of offenses see Appendix B.
- **FTA or new arrest** is a combined measure indicating an occurrence of an FTA, a new arrest, or both.

VALIDATION SAMPLE SIZES

For purposes of this report, general validation results are shown when the sample size was greater than 200. For analyses of predictive bias by race/ethnicity and gender, subgroup results are shown when the overall sample was at least 1,000 and each subgroup size was greater than 200. Sample sizes smaller than these may not produce reliable results. Alameda's sample size was sufficient for general validation results and analyses of predictive bias by race/ethnicity and gender.

---

[3] New criminal offenses are defined in four different ways to capture different outcomes of interest. All new criminal offense indicators are measured using data from the California Department of Justice (CA DOJ).
[4] CA DOJ records on arrests are likely more complete than CA DOJ records on court filings and dispositions. Court reporting to the CA DOJ is incomplete.
[5] Due to the short timeframe of the data collection period and delays in court reporting to the CA DOJ, new convictions may not be a complete measure of all arrests during the pretrial period that resulted in a conviction.

DATA DESCRIPTION AND LIMITATIONS

The data set for the pretrial risk assessment tool validation was created using data from the court and two agencies in the county, as well as statewide data from the California Department of Justice.

DATA SOURCES

- **Jail booking data**: Alameda County sheriff's office provided information on all individuals booked into the local county jail, including booking dates, charges, and releases.

- **Probation data**: Alameda County probation department performed pretrial assessment services and provided pretrial risk assessment information, which included assessment dates, scores, and recommendation for those assessed.

- **Court case data**: Alameda County superior court provided court case information, including pretrial disposition dates and the issuance of warrants for failures to appear for those with felony or misdemeanor criminal filings.

- **California Department of Justice Data (CA DOJ) data:** The California Department of Justice provided arrest and disposition data, including out-of-county filings, for booked defendants.

DATE RANGE

The time period for this validation extends from May 12, 2020 to February 3, 2022.

DATA LINKING AND FILTERING

Data were viewed based on a data sharing agreement and data views were joined and standardized to create a validation data frame of bookings with associated pretrial risk assessment information, relevant court case information, and outcomes during the pretrial period. Only a small subset of the assessments conducted were used in the validation dataset. In some instances, not all data could be matched across agencies. Alameda's data contained 12,464 VPRAI-R risk assessments that were scored. The assessed bookings column shows the number of bookings (12,444) for new arrests that have an associated risk assessment date, and that have the necessary personal identifier (CII) to link with DOJ data. Some assessed bookings in this column had an assessment date but did not have a risk score. The pretrial complete column shows the assessed bookings for which there is a final disposition in the data, whether the disposition is before or after filing of charges with the court. Dispositions of dropped charges before court filing that are not the reason for jail release are less likely to be present in the data unless recorded by the DOJ.

Due to the short timeframe of the data collection period, and the inclusion of all bookings through the entire data collection period, pretrial complete bookings present in the data are likely skewed towards dispositions that occur in a shorter time frame compared to all dispositions. The validation dataset (2,439) used for the analysis, shows the number of bookings with associated assessment scores and a final disposition who were released during the pretrial period.

Due to the limited timeframe of the data and the effects of COVID-19 on court operations, many individuals who were released pretrial may not have had final dispositions during the validation time frame and therefore could not be included in the analysis. The only bookings included in the validation analysis were those for which the individual was released pretrial and there was a final disposition associated with the booking because outcomes during the pretrial period were a primary interest of this analysis and so that the full pretrial period could be observed. This report refers to each booking linked with an associated assessment and completed pretrial period as a "pretrial observation."

Table 1 shows the number of assessments at each stage of filtering, and the type of validation that will be presented based on the number of pretrial observations.

Table 1. Counts of all assessments at each stage of filtration

Tool Name	County	Assessments	Assessed Bookings	Pretrial Complete	Validation Dataset	Validation Type
VPRAI-R	Alameda	12,464	12,444	4,745	2,439	General + Bias

DESCRIPTIVE STATISTICS

DEMOGRAPHICS

Table 2 provides the number of assessments in the evaluation dataset, the racial/ethnic and gender makeup, and the median age. Black and Hispanic racial/ethnic groups make up almost three-fourths of the population being evaluated, 42% and 29% respectively. The sample is primarily male 84% and the median age is 35 years old.[6]

Table 2. Demographic Profile of Evaluation Data Frame

County	Total	Race/Ethnicity (%)				Gender (%)		Median Age
		Black	White	Hispanic	Other	Male	Female	
Alameda	2,439	42	20	29	10	84	16	35

---

[6] Non-binary, other, and unknown genders represented less than 0.1% of the bookings in the evaluation dataset.

ARREST OFFENSES

Table 3 shows that felony arrests represented the majority of bookings (80%); misdemeanor arrests were a smaller share (19%). Violent offenses[7] represented 26% of bookings in the dataset, while property offenses were 25% and drug offenses were 14% of bookings in the dataset. DUI offenses were 4% of bookings, while DV offenses made up 17% of bookings in the evaluation dataset.

Table 3. Distribution of Arrest Offense Type in Evaluation Data Frame

County	Felony	Misdemeanor	Violent	Property	Drug	DUI	DV
Alameda	80	19	26	25	14	4	17

ADVERSE OUTCOMES

Several different adverse outcomes are measured during the pretrial period from pretrial release to disposition. Failure to appear (FTA), measured as bench warrants issued for FTA during the pretrial period were recorded for 30.4% of pretrial observations. Table 4 shows that new arrests during the pretrial period were recorded for 53% of pretrial observations. New arrests during the pretrial period resulting in filed charges were recorded for 25.3% of pretrial observations, and new arrests during the pretrial period resulting in convictions were recorded for 14.4% of pretrial observations.[8] New violent arrests[9] (including felony and misdemeanor arrests for offenses of a violent nature) were recorded during the pretrial period for 17.6% of pretrial observations.

Table 4. Rates of Pretrial Misconduct in Evaluation Data Frame

County	FTA	New Arrest	New Filing	New Conviction	New Violent Arrest
Alameda	30.4	53	25.3	14.4	17.6

CONDITIONS OF MONITORING/SUPERVISION

Data on supervision conditions were collected from the county probation department. Supervision conditions may have affected outcomes and may have been applied differentially according to risk score

---

[7] Violent offenses as defined by the pilot consensus PSA Violent Offense List, see Attachment B. These include both felonies and misdemeanors that are violent in nature.

[8] New arrest, new filing, and new conviction data are measured using CA DOJ data. New arrests and new violent arrests are reported to the CA DOJ from arresting agencies, whereas new filings and new convictions are reported to the CA DOJ from courts. The CA DOJ may have incomplete records of filings and convictions from the courts because of difficulties or delays in reporting, and not all new arrests during the pretrial period may have been resolved during the data collection period.

[9] New violent arrests are defined by the PSA Violent Offense List (see footnote 7 above)

which could confound results. Further research is needed to determine the impact of supervision conditions and to separate out the efficacy of the tools from the efficacy of supervision conditions.

ALAMEDA COUNTY VPRAI-R VALIDATION

GENERAL VALIDATION

Figure 1 shows the distribution of risk levels for individuals in the evaluation dataset assessed with the VPRAI-R tool. The VPRAI-R was specifically designed to predict a composite of Failure to Appear (FTA), New Arrest (NA), and Technical Violations (TV). [10] The VPRAI-R tool developer divided the risk scores into 6 risk levels, the first level includes scores 0-2, the second level includes scores 3-4, the third level includes scores 5-6, the fourth level includes scores 7-8, the fifth level includes scores 9-10, and the sixth level includes scores 11-14. Risk level six was the least frequently assessed level in the evaluation dataset. Table 5 shows the count of individuals scored in each risk level.

Figure 1. Distribution of VPRAI-R Risk Scores

Alameda Distribution of Assessments by VPRAI−R Risk Category

---
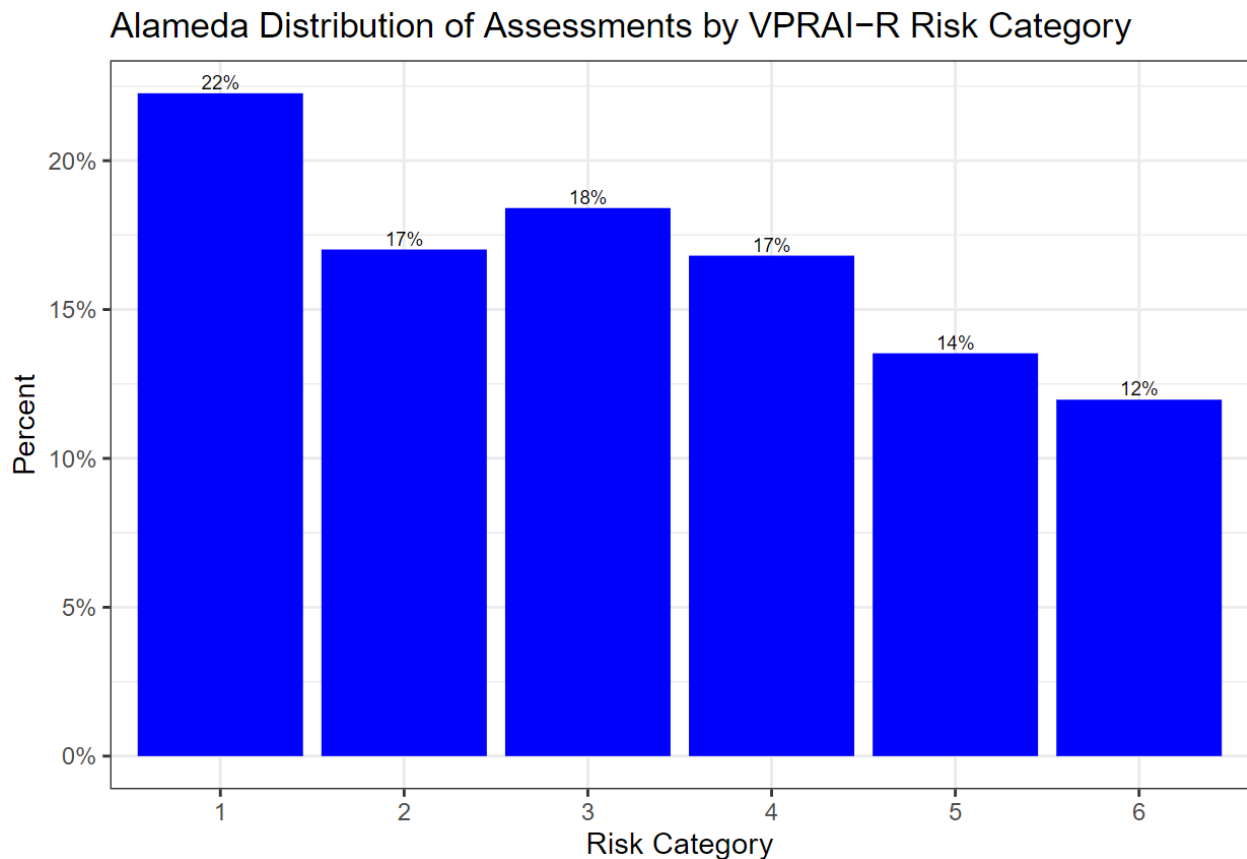
[10]The low quality of the data on technical violations prevented us from creating a composite failure rate that included FTA, new arrest and technical violations. The composite measure in this report is a combination of the risk of FTA and the risk of new arrest.

Table 5. Counts of Individuals by VPRAI-R Risk Scores

VPRAI-R Risk Level	Total
1	543
2	415
3	449
4	410
5	330
6	292

Table 6 shows the AUC value for the VPRAI-R tool, using the full range of risk levels, for each outcome of interest. The AUC value is a single number that represents the ability of the tool to differentiate between individuals who are lower or higher risk across the range of the tool. For criminal justice risk assessments, a common metric for evaluating AUC values is derived from Desmarais and Singh (2013), who defined AUC values less than 0.55 as poor, 0.55-0.63 as fair, 0.64-0.70 as good, and 0.71-1.00 as excellent. By these definitions, the AUC values for the VPRAI-R are excellent for new arrest and the combined measure of "FTA or new arrest", good for FTA, new filing, and new conviction, and fair for new violent arrest.

The 95% confidence interval is also shown, which represents the range of AUC estimates the true AUC value is statistically 95% likely to fall between. A smaller range indicates that, given the size of the sample and pattern of the data, the AUC can be estimated with greater precision.

Table 6. AUC values for Outcomes of Interest

Outcome	AUC	CI (95%)
FTA	0.682	0.66-0.704
New Arrest	0.727	0.708-0.747
New Filing	0.683	0.659-0.706
New Conviction	0.671	0.643-0.7
New Violent Arrest	0.577	0.549-0.606
FTA or New Arrest	0.726	0.706-0.746

Note:

N = 2439

Figure 2 shows the rate of various adverse outcomes during the pretrial period at each risk score of the VPRAI-R.[11] For most outcomes of interest,[12] the observed rates of the outcome generally increase as the assessed risk level increases, but the pattern is not entirely consistent for the new violent arrest outcome across all risk scores.

Figure 2. VPRAI-R Outcomes by Risk Category
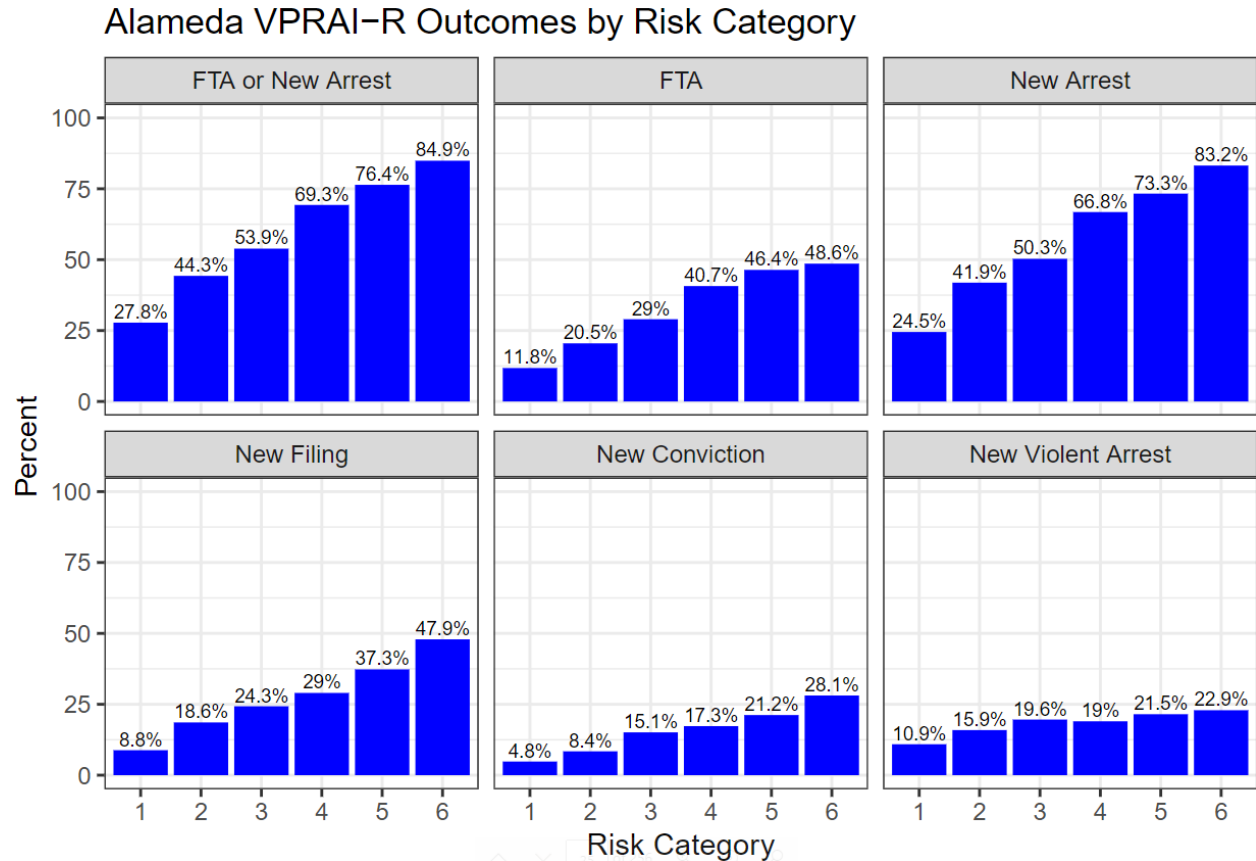
Table 7 shows the results from logistic regression models predicting each outcome of interest. The models control for the number of days the defendant spent released during the pretrial period. For each outcome of interest, the models show that the relevant VPRAI-R risk score is statistically significantly (p<0.001) associated with the likelihood of the outcome during the pretrial period. The number of days an individual was out on release also was a statistically significant predictor of all outcomes of interest. Therefore, the longer an individual spends on release, the more likely the individual is to experience these outcomes.

---

[11] Risk levels are groupings of scores as defined by the tool developer.
[12] See validation methodology section for definitions of each outcome of interest

Table 7. Logistic Regression Models Predicting the Likelihood of Outcomes of Interest by Risk Scores Controlling for Days Released

	Dependent variable:					
	FTA	New Arrest	New Filing	New Conviction	New Violent Arrest	FTA or New Arrest
	(1)	(2)	(3)	(4)	(5)	(6)
VPRAI-R Risk Score	0.448***	0.578***	0.412***	0.382***	0.184***	0.587***
	(0.030)	(0.030)	(0.030)	(0.037)	(0.032)	(0.031)
Days Released	0.003***	0.003***	0.001***	0.001***	0.002***	0.003***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
Constant	−3.093***	−2.254***	−2.748***	−3.440***	−2.684***	−2.225***
	(0.148)	(0.129)	(0.145)	(0.183)	(0.155)	(0.130)
Observations	2,439	2,439	2,439	2,439	2,439	2,439
Log Likelihood	−1,325.926	−1,436.907	−1,273.953	−944.107	−1,096.284	−1,415.737
Akaike Inf. Crit.	2,657.851	2,879.814	2,553.907	1,894.214	2,198.568	2,837.473

Note: *p<0.05; **p<0.01; ***p<.00

ANALYSIS OF PREDICTIVE BIAS

RACE

The following chart shows the distribution of VPRAI-R risk assessment scores by race/ethnicity. The Hispanic race/ethnicity group was more concentrated at the lowest risk level compared to the White and Black groups.

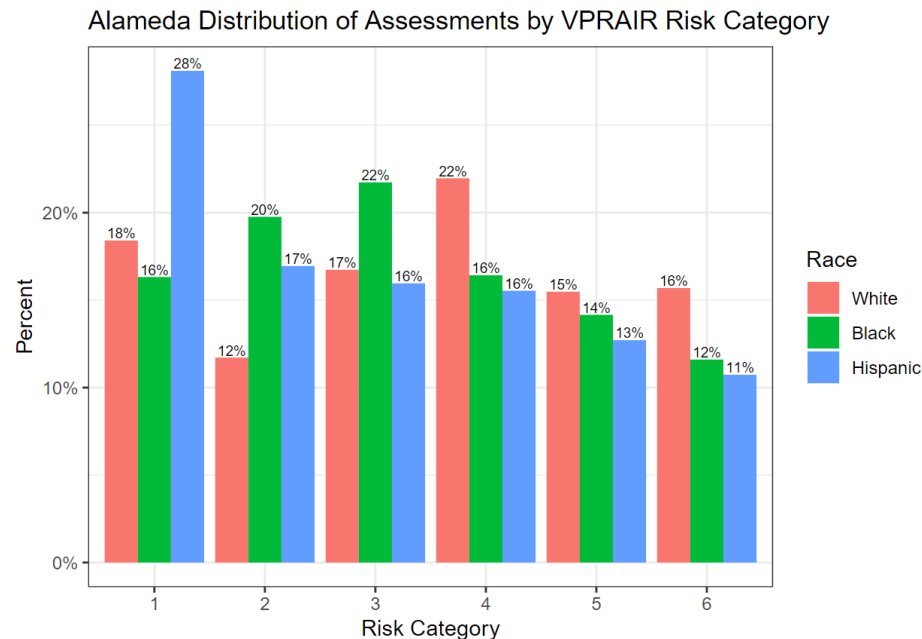Figure 3. Distribution of Risk Scores by Race/Ethnicity

Table 8. Count of Individuals by VPRAI-R Risk Scores and Race/Ethnicity

VPRAIR Risk Score	White	Black	Hispanic
1	88	166	199
2	56	201	120
3	80	221	113
4	105	167	110
5	74	144	90
6	75	118	76

The number of assessed individuals in each race/ethnicity group (Table 8) is sufficient to run statistical tests that look at how the VPRAIR-R tool scales performed by race/ethnicity.

Table 9 shows the AUC values[13] and 95% confidence intervals for each outcome of interest for each race/ethnicity group. Except for the AUC values for new violent arrest, which are in the fair range for all three groups, and the AUC for FTA for the black group, which is also in the fair range, all other AUC values are in the good to excellent range. Statistical testing[14] indicates that the Black AUC is statistically significantly lower than both the White and Hispanic AUCs for the outcomes of FTA, new arrest, and "FTA and New Arrest", and the Black AUC is statistically significantly lower than the White AUC for the outcome of new filing. These results indicate that the VPRAI-R scale has a stronger ability to distinguish between individuals who are lower or higher risk for White individuals than Black individuals for FTA, new arrest, new filing, and "FTA and New Arrest", and a stronger ability to distinguish between individuals who are lower or higher risk for Hispanic individuals than Black individuals for FTA, new arrest, new conviction, and "FTA and New Arrest".

Table 9. AUC values for Outcomes of Interest by Race/Ethnicity

Outcome	AUC			CI (95%)		
	White	Black	Hispanic	White	Black	Hispanic
FTA	0.694	0.632	0.722	0.648-0.74	0.596-0.668	0.682-0.763
New Arrest	0.738	0.664	0.774	0.695-0.782	0.631-0.697	0.741-0.808
New Filing	0.716	0.644	0.695	0.667-0.765	0.606-0.682	0.653-0.737
New Conviction	0.697	0.642	0.681	0.636-0.759	0.594-0.69	0.632-0.731
New Violent Arrest	0.573	0.553	0.622	0.505-0.64	0.51-0.597	0.569-0.675
FTA or New Arrest	0.741	0.654	0.779	0.696-0.785	0.621-0.687	0.746-0.812

Note:

N White = 478 , N Black = 1017 , N Hispanic = 708

---

[13] See page 10 for description of the meaning of AUC values.
[14] See Appendix C for DeLong's test for two ROC curves.

Figure 4 shows the results of statistical models of the predictive power of the VPRAI-R tool for each outcome of interest for each race/ethnicity group. Each line represents the probability of each outcome of interest at each risk score separately for each race/ethnicity. The grey area around each line represents a 95% confidence interval. When the grey areas do not overlap, the evidence indicates that there is likely a true difference between the groups. Conversely, when the grey areas overlap, the evidence may not be strong enough to conclude that there are differences between them.

For all outcomes, the confidence intervals of the lines for Black, Hispanic, and White largely overlap. Thus, there may be insufficient evidence to conclude any true difference in the likelihood of those outcomes for individuals differ across these groups with the same score. The 95% confidence interval is notably wider for new violent arrest due to the rare occurrence of this outcome, which diminishes the ability of the model to make precise predictions.

Figure 4. Comparison of Racial/Ethnic Differences in Logistic Regression Curves
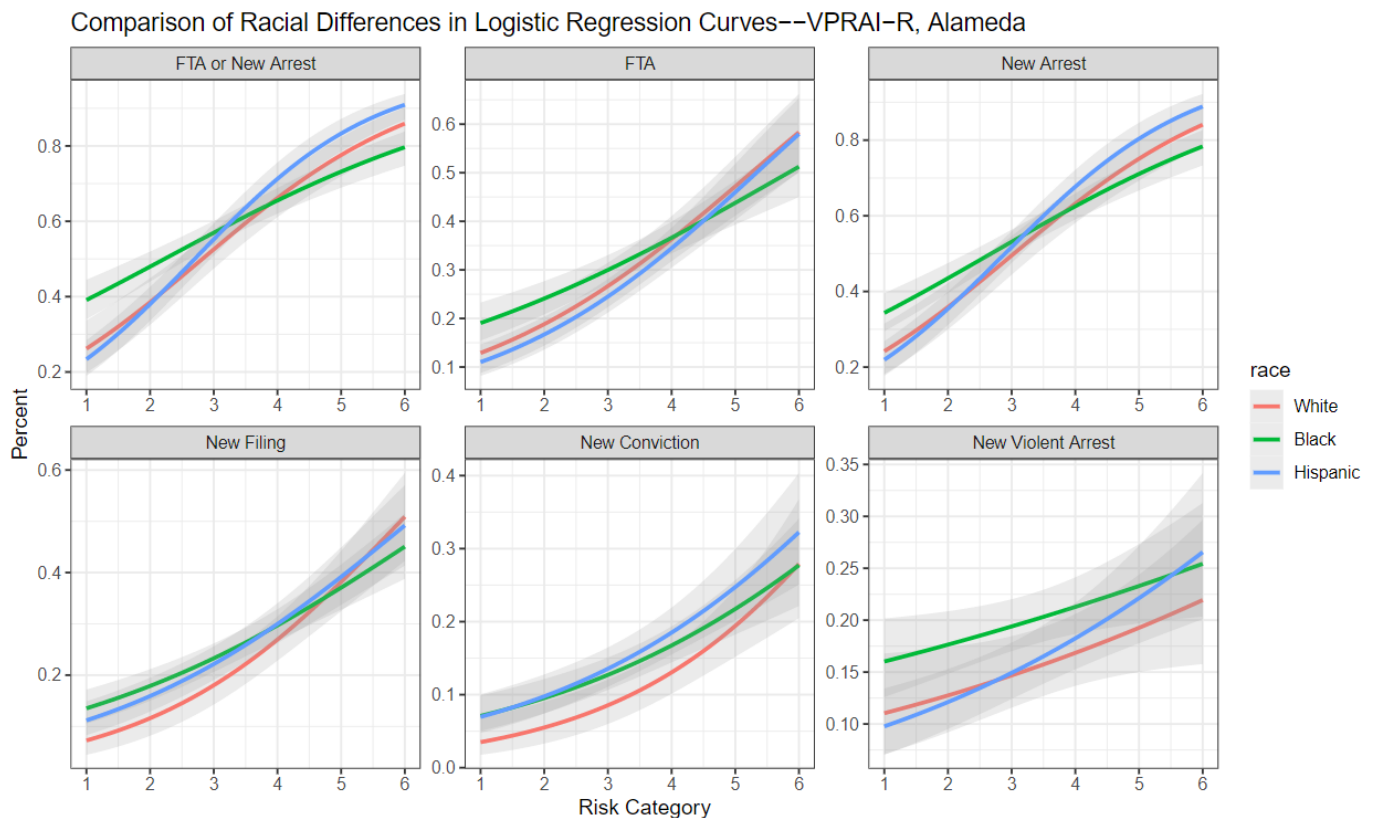
Table 10 shows the results of a logistic regression which predicts each outcome of interest by the relevant VPRAI-R risk score, race, and number of days spent released. This statistical test compares Black and Hispanic individuals with white individuals. The VPRAI-R risk score is a statistically significant (p<0.001) predictor of all outcomes of interest. The number of days an individual out on release was a statistically significant predictor (p<0.001) of all outcomes of interest, indicating that the longer an individual spends on release, the more likely the individual is to experience these outcomes. Except for Hispanic ethnicity being a statistically significant predictor (p<0.05) for new conviction, the results

indicate that Black race and Hispanic ethnicity were not statistically significant predictors of the other outcomes of interest.

This statistical test is limited, however, because it tests for an overall effect of race across the full risk scale, and as can be seen from the above charts there may be different patterns across particular ranges of the tool. The next table will use a more complex statistical model that allows for this possibility.

Table 10. Logistic Regression Model Predicting the Likelihood of Outcomes of Interest by Risk Scores and Race/Ethnicity, Controlling for Days released

|	*Dependent variable:*					
	FTA	New Arrest	New Filing	New Conviction	New Violent Arrest	FTA or New Arres
	(1)	(2)	(3)	(4)	(5)	(6)
VPRAI-R Risk Score	0.446***	0.565***	0.407***	0.381***	0.192***	0.574***
	(0.032)	(0.032)	(0.032)	(0.039)	(0.035)	(0.033)
Race:Black	0.004	0.065	0.127	0.246	0.281	0.103
	(0.127)	(0.124)	(0.133)	(0.167)	(0.150)	(0.125)
Race:Hispanic	−0.169	0.016	0.119	0.368*	0.025	0.010
	(0.139)	(0.133)	(0.144)	(0.177)	(0.165)	(0.134)
Days Released	0.004***	0.003***	0.001***	0.001***	0.002***	0.003***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
Constant	−3.046***	−2.266***	−2.855***	−3.680***	−2.869***	−2.261***
	(0.185)	(0.168)	(0.188)	(0.238)	(0.206)	(0.170)
Observations	2,203	2,203	2,203	2,203	2,203	2,203
Log Likelihood	−1,205.537	−1,303.609	−1,158.107	−858.793	−991.382	−1,279.220
Akaike Inf. Crit.	2,421.073	2,617.218	2,326.214	1,727.585	1,992.763	2,568.439

Note: *p<0.05; **p<0.01; ***p<.00

Table 11 shows the results of a logistic regression which predicts each outcome of interest by VPRAI-R risk score, race, the interaction between race and VPRAI-R risk score, and number of days spent released. This statistical test again compares Black and Hispanic individuals with white individuals. Across all outcomes of interest, risk score is statistically significant with new violent arrest at p<0.05 and all other outcomes at p<0.001. The number of days released is a statistically significant (p<0.001) predictor of all outcomes of interest.

There is a statistically significant (p<0.05) interaction between Black race and VPRAI-R risk score on new arrest, new filing, and the combined measure of "FTA or new arrest," indicating that the impact of Black race on each of these outcomes varies at different risk scores. The results indicate that Black race was a statistically significant predictor for all three of these outcomes at the low end of the risk scale, such that Black individuals were more likely to experience new arrest, new filing, or "FTA or new arrest" compared to White individuals with the same risk score. At the high end of the risk scale, on the other hand, Black individuals were slightly less likely than White individuals with the same risk score to experience each of these outcomes, but none of these differences were statistically significant.

There are no statistically significant interactions between Hispanic ethnicity and VPRAI-R risk score on any of the outcomes of interest.

Table 11. Logistic Regression Model Predicting the Likelihood of Outcomes of Interest by Risk Scores, Race/Ethnicity, and Interaction of Race/Ethnicity and Risk Scores, Controlling for Days released

	Dependent variable:					
	FTA	New Arrest	New Filing	New Conviction	New Violent Arrest	FTA or New Arres
	(1)	(2)	(3)	(4)	(5)	(6)
VPRAI-R Risk Score	0.488***	0.604***	0.521***	0.474***	0.176*	0.625***
	(0.068)	(0.067)	(0.075)	(0.095)	(0.076)	(0.069)
Race:Black	0.350	0.440*	0.642*	0.673	0.348	0.547*
	(0.259)	(0.223)	(0.299)	(0.399)	(0.287)	(0.222)
Race:Hispanic	−0.297	−0.203	0.435	0.668	−0.209	−0.239
	(0.279)	(0.235)	(0.310)	(0.408)	(0.308)	(0.234)
Days Released	0.004***	0.003***	0.001***	0.001***	0.002***	0.003***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
VPRAI-R*Black	−0.131	−0.171*	−0.174*	−0.134	−0.029	−0.209*
	(0.081)	(0.080)	(0.088)	(0.111)	(0.090)	(0.082)
VPRAI-R*Hispanic	0.057	0.127	−0.099	−0.089	0.095	0.153
	(0.087)	(0.089)	(0.093)	(0.114)	(0.097)	(0.091)
Constant	−2.721***	−1.801***	−2.798***	−3.607***	−2.631***	−1.812***
	(0.236)	(0.204)	(0.271)	(0.363)	(0.262)	(0.204)
Observations	2,203	2,203	2,203	2,203	2,203	2,203
Log Likelihood	−1,201.792	−1,294.803	−1,156.033	−858.046	−990.099	−1,266.835
Akaike Inf. Crit.	2,417.584	2,603.606	2,326.066	1,730.092	1,994.197	2,547.669

Note: *p<0.05; **p<0.01; ***p<.00

GENDER

Figure 5 shows the distribution of risk assessment scores by gender. The distribution of risk scores for women, as compared with men, is skewed toward the lower risk scores.

Figure 5. Distribution of Risk Scores by Gender

Alameda Distribution of Assessments by VPRAI−R Risk Category
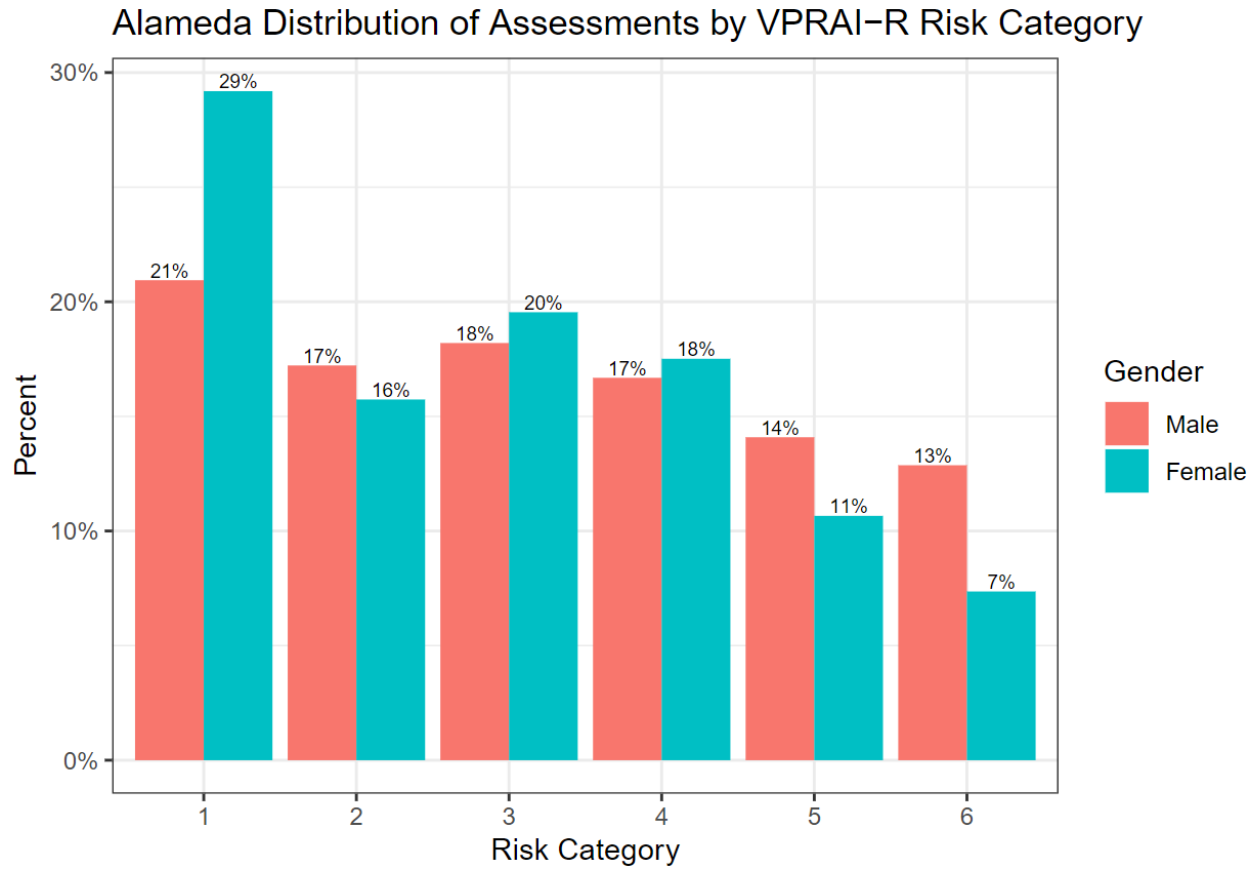
Table 12. Count of Individuals by VPRAI-R Risk Scores and Gender

VPRAIR Risk Score	Male	Female
1	428	115
2	352	62
3	372	77
4	341	69
5	288	42
6	263	29

The number of assessed individuals in each gender group (Table 12) is sufficient to run statistical tests that look at how the VPRAI-R tool scales performed by gender.

Table 13 shows the AUC values[15] and 95% confidence intervals for each outcome of interest and VPRAI-R risk score separately for each race/ethnicity group. The AUC values fall mostly in the fair to good range. The AUC values for new arrest and combined measure of "FTA or new arrest" in the male category both fall in the excellent range. Statistical testing[16] indicates that there is a statistically significant difference in AUC between females and males for the outcomes of new arrest and "FTA or new arrest," indicating that the tool has a better ability to distinguish between lower and higher risk individuals for men than for women on these outcomes.

Table 13. AUC values for Outcomes of Interest by Gender

	AUC		CI (95%)	
Outcome	Female	Male	Female	Male
FTA	0.669	0.685	0.612-0.726	0.661-0.709
New Arrest	0.668	0.736	0.616-0.72	0.715-0.758
New Filing	0.630	0.688	0.561-0.699	0.664-0.713
New Conviction	0.607	0.677	0.515-0.7	0.647-0.707
New Violent Arrest	0.592	0.573	0.517-0.668	0.542-0.604
FTA or New Arrest	0.656	0.737	0.604-0.709	0.716-0.759

Note:
N Female = 394 , N Male = 2044

Figure 6 shows the results of statistical models of the predictive power of the VPRAI-R risk score for each outcome of interest for women as compared to men. Each line represents the probability of each outcome of interest at each risk score separately for each gender. The grey area around each line represents a 95% confidence interval – where the grey areas do not overlap the evidence indicates there is likely a true difference between the groups, where the grey areas overlap the evidence may not be strong enough to conclude that there are differences between them.

---

[15] See page 10 for description of the meaning of AUC values.
[16] DeLong's test for two ROC curves (see Appendix C)

Because there are fewer women at the high end of the risk distributions, the 95% confidence intervals tend to be wider at the high end of the distributions for each outcome.[17] The confidence intervals for the combined measure of "FTA or new arrest" and new arrest do not overlap at the higher range of scores, which indicate that women experience lower rate of this outcome in that score range. The confidence intervals for men and women are overlapping for FTA, new filing, new conviction, and new arrest, indicating there may not be sufficient evidence to conclude that there is a true difference.

Figure 6. Comparison of Gender Differences in Logistic Regression Curves
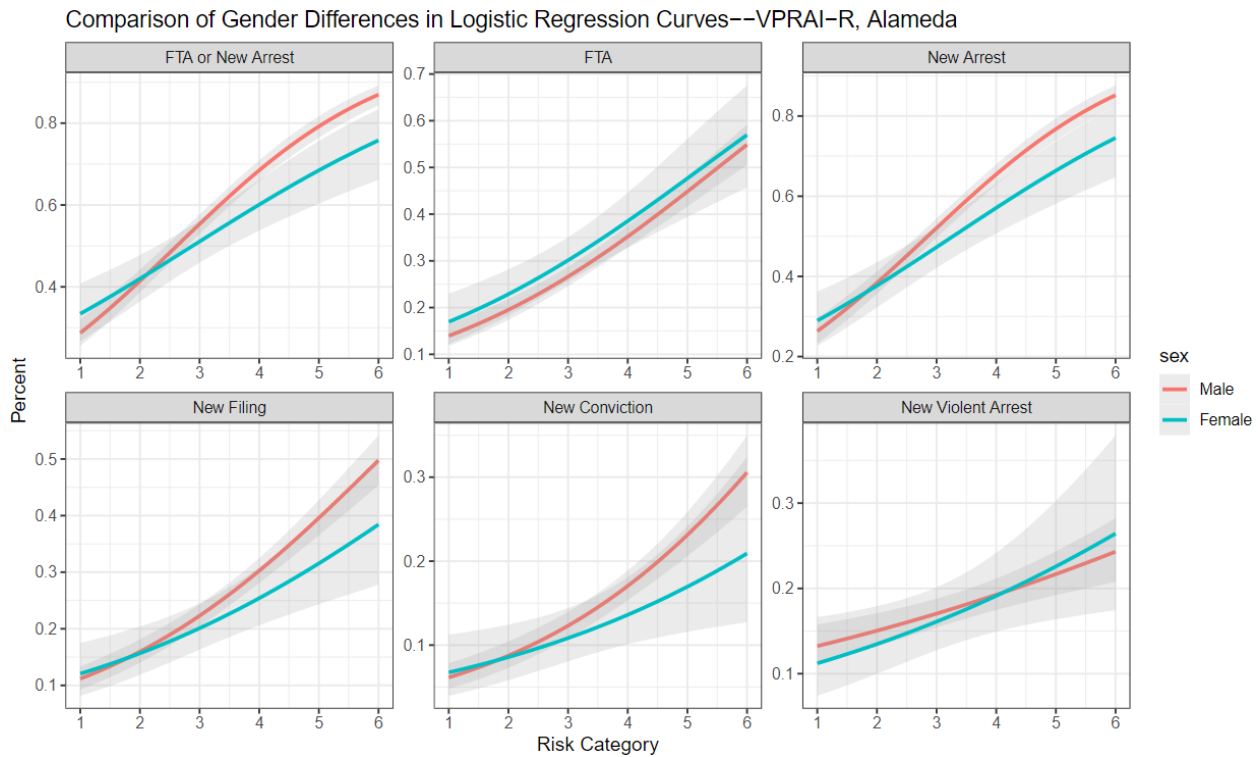
Comparison of Gender Differences in Logistic Regression Curves--VPRAI-R, Alameda

Table 14 shows the results of a logistic regression which predicts each outcome of interest by the VPRAI-R risk score, gender, and number of days spent released. This statistical test compares women with men. VPRAI-R risk score is a statistically significant (p<0.001) predictor of all outcomes of interest. The number of days the individual was out on release was a statistically (p<0.001) significant predictor of all outcomes of interest indicating that the longer an individual spends on release, the more likely the individual is to experience one or more of the outcomes of interest.

Results indicate that female gender is not statistically significant predictor for any of the outcomes of interest. This statistical test is limited, however, because it tests for an overall effect of gender across

[17] Additionally, level six included individuals who scored 11,12, 13 or 14, and no females had an assessed risk score of 14.

the full risk scale, and as can be seen from the above charts there may be different patterns for women as compared to men. The next table will use a more complex statistical model that allows for this possibility.

Table 14. Logistic Regression Model Predicting the Likelihood of Outcomes of Interest by Risk Scores and Gender, Controlling for Days Released

|	*Dependent variable:*					
	FTA	New Arrest	New Filing	New Conviction	New Violent Arrest	FTA or New Arres
	(1)	(2)	(3)	(4)	(5)	(6)
VPRAI-R Risk Score	0.452***	0.575***	0.409***	0.378***	0.182***	0.584***
	(0.030)	(0.030)	(0.030)	(0.037)	(0.032)	(0.031)
Female	0.189	−0.174	−0.176	−0.209	−0.046	−0.137
	(0.129)	(0.122)	(0.140)	(0.176)	(0.151)	(0.122)
Days Released	0.003***	0.003***	0.001***	0.001***	0.002***	0.003***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
Constant	−3.138***	−2.216***	−2.710***	−3.395***	−2.672***	−2.194***
	(0.152)	(0.132)	(0.148)	(0.186)	(0.158)	(0.133)
Observations	2,438	2,438	2,438	2,438	2,438	2,438
Log Likelihood	−1,324.657	−1,435.398	−1,272.972	−943.285	−1,096.081	−1,414.562
Akaike Inf. Crit.	2,657.313	2,878.796	2,553.944	1,894.569	2,200.161	2,837.123

Note: *p<0.05; **p<0.01; ***p<.00

Table 14 shows the results of a logistic regression which predicts each outcome of interest by VPRAI-R risk score, gender, the interaction between gender and VPRAI-R risk score, and number of days spent released. Risk score is a statistically significant predictor ($p<0.001$) of all outcomes of interest. The number of days spent released is also a statistically significant predictor ($p<0.001$) of all outcomes of interest. This statistical test again compares women with men as the base group.

There is a statistically significant interaction between gender and risk score on the new arrest ($p<0.05$) and the "FTA or new arrest" ($p<.01$) outcomes. The results indicate that there is no significant difference in likelihood of outcomes for women and men with the same risk score at the low end of the risk scale, but at the high end of the risk scale women are statistically significantly less likely to experience new arrest ($p < 0.05$) or "FTA or new arrest" ($p < 0.01$) compared to men with the same risk score.

Table 15. Logistic Regression Model Predicting the Likelihood of Outcomes of Interest by Risk Scores, Gender, and Interaction of Gender and Risk Scores, Controlling for Days Released

	Dependent variable:					
	FTA	New Arrest	New Filing	New Conviction	New Violent Arrest	FTA or New Arres
	(1)	(2)	(3)	(4)	(5)	(6)
VPRAI-R Risk Score	0.457***	0.602***	0.425***	0.395***	0.174***	0.617***
	(0.033)	(0.033)	(0.033)	(0.040)	(0.035)	(0.034)
Female	0.261	0.136	0.095	0.109	−0.177	0.225
	(0.221)	(0.190)	(0.244)	(0.314)	(0.255)	(0.187)
Days Released	0.003***	0.003***	0.001***	0.001***	0.002***	0.003***
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)
VPRAI-R*Female	−0.032	−0.163*	−0.112	−0.124	0.059	−0.197*
	(0.080)	(0.077)	(0.085)	(0.105)	(0.091)	(0.078)
Constant	−2.699***	−1.695***	−2.346***	−3.068***	−2.468***	−1.675***
	(0.132)	(0.112)	(0.130)	(0.164)	(0.138)	(0.113)
Observations	2,438	2,438	2,438	2,438	2,438	2,438
Log Likelihood	−1,324.576	−1,433.250	−1,272.115	−942.596	−1,095.869	−1,411.447
Akaike Inf. Crit.	2,659.152	2,876.500	2,554.230	1,895.191	2,201.738	2,832.893

Note: $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<.00$

Appendix A.

Table A1. Virginia Pretrial Risk Assessment Instrument, *Revised* (VPRAI-R): Factors and Weights

Risk Factor	Criteria	Weight
Active Community Criminal Justice Supervision	If the defendant is under active community supervision at the time of arrest	No = 0
		Yes = 2
Charge is Felony Drug, Felony Theft, or Felony Fraud	If the defendant's charge is felony drug, felony theft, or felony fraud	No = 0
		Yes = 3
Pending Charge(s)	If the defendant had one or more charge(s) pending in court at the time of the arrest	No = 0
		Yes = 2
Criminal History	If the defendant had one or more misdemeanor or felony convictions	No = 0
		Yes = 2
Two or More Failures to Appear	If the defendant had two or more failure to appear convictions	No = 0
		Yes = 1
Two or More Violent Convictions	If the defendant had two or more violent convictions	No = 0
		Yes = 1
Unemployed at Time of Arrest	If the defendant is unemployed, a full-time student, a primary caregiver, or a retiree at the time of arrest	No = 0
		Yes = 1
History of Drug Abuse	If the defendant had a history of drug abuse	No = 0
		Yes = 2
Point Range		**0–14**

Appendix B.

PC CODE	Description
69	Obstructing or resisting exec officer in performance of duty; threats, force, or violence
136.1(c)(1)	Intimidating/Threat Witness/Victim and Act is accompanied by force
140(a)	Threatening Witnesses, victims or informants.
148(b)	Removal or taking of weapon other than firearm from peace officer during commission of resisting offense
148(c)	Removal or taking of firearm from peace officer during commission of resisting offense
148(d)	Removal or taking of weapon firearm from peace officer engaged in performance of duty
148.10(a)	Resist Po: Cause death/SBI
149	Assault by a public officer
151	Advocacy to kill or injure peace officer
186.26(c)	Use of coercion or violence to solicit or recruit another to actively participate in criminal street gang
187(a)	Murder first or second degree
191.5(a)	Gross vehicular manslaughter while intoxicated
192(a)	Voluntary manslaughter
192(b)	Involuntary manslaughter
192(c)(1)	Vehicular manslaughter with gross negligence
192(c)(3)	Vehicular manslaughter
192.5(a)	Vehicular manslaughter in the operation of a vessel while intoxicated
192.5(b)	Vehicular manslaughter in the operation of a vessel while intoxicated
192.5(c)	Vehicular manslaughter in the operation of a vessel
203	Mayhem
205	Aggravated Mayhem
206	Torture

207(a)	Kidnapping
207(b)	Kidnap -14 to com l&l
207(c)	Kidnapping by false pretense
207(d)	Kidnapping from outside the state
208(b)	Kidnap child under 14 yrs
209(a)	Kidnapping for ransom
209(b)(1)	Kidnap: commit rob/rape/etc
209.5(a)	Kidnap during carjacking
210.5	False imprisonment of a hostage
667.85	Kidnap to deprive parent
211	Robbery: first or second degree
212	Fear defined for robbery
212.5	Robbery; degrees
214	Train robbery
215	Carjacking
217.1(a)	Assault on a public official
217.1(b)	Attempted murder of a public official
218	Train wrecking; attempt; punishment.
218.1	Obstructing railroad track; punishment.
219	Train derailing or wrecking; punishment.
219.1	Throwing missile at common carrier with bodily harm
219.2	Throwing hard substance or shooting missile at train or other conveyance
220	Assault with intent to commit mayhem, rape, sodomy, oral copulation, or any violation of Section 264.1, 288, or 289
220(a)(1)	Assault with intent to commit a felony
220(a)(2)	Assault with intent to commit a felony-victim under 18

220(b)	Assault to commit a felony during the commission of a first degree burglary
222	Administering to another any chloroform, ether, laudanum, or any controlled substance, anesthetic, or intoxicating agent
236	False imprisonment
236.1	Human trafficking; provisions regarding minors; consideration of total circumstances
237(a)	False imprisonment
240	Assault
241	Assault
241.1	Assault on custodial officer
241.2	Assault on school or park property
241.3	Assault against person on public transportation, both on property of and within motor vehicle of provider
241.4	Assault on peace officer of a school district
241.5	Assault on a highway worker
241.6	Battery on school employee
241.7	Assault against jurors
241.8(a)	Battery against member of us armed forces
242	Battery
243	Battery
243.1	Battery on custodial officer
243.2(a)(1)	Battery on pers on school/park/grnds
243.25	Battery on an elder or dependent adult
243.3	Battery on transportation personnel/passenger
243.35	Battery on public transportation provider
243.4	Sexual battery
243.5(a)(1)	Assault or battery on school prop

243.6	Battery on school employee
243.65(a)	Battery against a highway worker
243.7	Battery against jurors
243.8(a)	Battery against a sports official
243.9(a)	Aggravated battery by gassing on peace officer or local detention facility employee
244	Aslt w/caustic chem/etc
244.5(b)	Assault with stun gun/taser
244.5(c)	Assault with stun gun or taser on peace officer or firefighter
245(a)(1)	Force/adw-not firearm: gbi
245(a)(2)	Aslt w/ firearm on person
245(a)(3)	Aslt w/machinegun on person
245(a)(4)	Force/adw not firearm: gbi
245(b)	Assault w/semiauto rifle
245(c)	Adw not f/arm: po/fire: gbi
245(d)(1)	Assault with a firearm upon a peace officer or firefighter
245(d)(2)	Assault on peaceofficer/firefighter with semiautomatic firearm
245(d)(3)	Machine gun/assault weapon on a peace officer/firefighter
245.2	Assault (adw/gbi) upon transportation personnel, mass transit personnel
245.3	Assault (adw/gbi) upon a custodial officer
245.5(a)	Adw/gbi schl emp: no f/arm
245.5(b)	Assault with firearm on a school employee
245.5(c)	Adw/stun gun or taser: school employee
245.6	Hazing resulting in death/serious bodily injury
246	Shoot: inhab dwell/veh/etc
246.3(a)	Firearm disch w/neg

246.3(b)	BB device disch w/ neg
261(a)	Rape
261.5(a)	Sex intercourse w/mnr -18
261.5(b)	Sex w/minor: + or - 3 yrs
261.5(c)	Sex w/minor:3+ yrs younger
261.5(d)	Sex w/minor: perp 21+ vic-16
262(a)(1)	Rape spouse by force/etc
262(a)(2)	Rape spouse und c/sub/etc
262(a)(3)	Rape: spouse uncon of act
262(a)(4)	Rape: spouse - threat to kidnap, inflict extreme pain, serious bodily injury
262(a)(5)	Rape: spouse - threat to incarcerate, arrest, deport
262(a)(6)	Rape of spouse by threat to arrest or deport
264.1	Rape/etc: cncrt force/viol
266a	Taking a person for prostitution
266b	Abduction to live in illicit relation; using force
266c	Unlawful sexual intercourse, sexual penetration, oral copulation, or sodomy; consent procured by false or fraudulent representation with intent to create fear
266h(b)	Pimping a minor
266i(b)	Pandering a minor
266j	Procurement of child under age 16 for lewd and lascivious acts
267	Abduction; person under 18 for purpose of prostitution
269(a)	Agg sex aslt: mnr: frce/etc
273.4	Female genital mutilation
273.5(a)	Injuring a spouse, cohabitant, fiancé, boyfriend, girlfriend or child's parent
273.5(f)	Inf crpl inj: sps/etc w/pr

273.6(b)	Viol crt ord to prev domes viol – results in physical injury
273.6(d)	Domestic violence w/prior – act of violence or a credible threat of violence
273a(a)	Willful cruel to child/poss inj/death
273a(b)	Willful cruelty to child
273ab(a)	Assault of child under 8 by force likely to produce GBI resulting in death
273ab(b)	Assault of child under 8 by force likely to produce GBI resulting in brain injury, paralysis
273d(a)	Inflict injury upon child
278	Child stealing
285	Incest
286(b)	Sodomy: person under 18
286(c)	Sodomy: person under 14
286(d)	Sodomy in concert w/force
286(f)	Sodomy: vict uncons of act
286(g)	Sodomy: vict incapbl:consent
286(h)	Sodomy: vic/def in mntl inst
286(i)	Sodomy: no ok: vict drugged
286(j)	Sodomy by impersonation
286(k)	Sodomy under color of authority
288(a)	Lewd or lasciv acts/w/child und 14yrs
288(b)	Lewd/lasc acts w/child under 14 or dependent person
288(c)	Lewd/lasc act w/chld 14/15:def 10yr+ or dependent person
288.2(a)	Harmful mtr sent w/int of seduc minor
288.3	Contact with intent to commit sex act
288.4	Arranging a meeting with minor for lewd purposes
288.5(a)	Continuous sexual abuse of child

288.7(a)	Sex/sodomy with a child under 10
288.7(b)	Oral copulation/sexual penetration with a child under 10
287(b)	Oral copulation w/pers und 18yrs
287(c)	Oral copul w/person und 14/by force
287(d)	Oral cop in concert: vic incap of con
287(f)	Oral cop: vic uncon/asleep
287(g)	Oral copulation of an incompetent person
287(h)	Oral cop: vic/def in mntl inst
287(i)	Oral copulation by anesthesia or controlled substance
287(j)	Oral copulation by impersonation
287(k)	Oral copulation under color of authority
288a(b)	Oral copulation w/pers und 18yrs
288a(c)	Oral copul w/person und 14/by force
288a(d)	Oral cop in concert: vic incap of con
288a(f)	Oral cop: vic uncon/asleep
288a(g)	Oral copulation of an incompetent person
288a(h)	Oral cop: vic/def in mntl inst
288a(i)	Oral copulation by anesthesia or controlled substance
288a(j)	Oral copulation by impersonation
288a(k)	Oral copulation under color of authority
289	Sexual pen with force/etc
289.6(a)(3)	Sex: emp/etc cnf/detention fac
311.4(a)	Using Minors for Sex Acts
311.4(b)	Using Minors for Commercial Sex Acts
311.4(c)	Using Minors for Sex Acts
347(a)	Poisoning, willful poison/etc food/etc

368(b)	Cause harm/death elder dep adult
368(c)	Elder/dependent adult cruelty
368(f)	False imprison: elder/dep adult violence
404(a)	Rioting
417(a)	Exhibit firearm or deadly weapon other than gun. Drawing, exhibiting, or using firearm or deadly weapon; self defense; peace officers.
417(b)	Exhibit firearm. Drawing, exhibiting, or using a firearm
417(c)	Exhibit firearm in presence of p.o. Drawing, exhibiting, or using firearm or deadly weapon; self defense; peace officers.
417.3	Exhibit firearm pres beh occupt
417.8	Exhibit firearm/etc: resist arrest
422.6(a)	Violate civil rights by force or threat
451(a)	Arson causing great bodily injury
451(b)	Arson: inhabited structure/property
451.1	Arson with added circumstances
451.5(a)	Aggravated arson
452(a)	Causing fire that causes gbi
452(b)	Causing fire of inhabited struc/prop
455	Arson attempts and acts preliminary or in furtherance
646.9(a)	Stalking
646.9(b)	Stalking/temp restraining order
647.6(a)(1)	Annoy/molest child under 18yrs
647.6(b)	Annoy/molest child/ill entry of bldg
647.6(c)	Annoy/etc child -18 w/prior
667.61(d)(2)	Felony sex offenses; victim kidnapped increasing risk of harm
667.61(d)(3)	Felony sex offenses; victim tortured
667.61(e)(1)	Felony sex offense; victim kidnapped

667.61(e)(2)	Felony sex offenses during commission of burglary
667.61(e)(4)	Felony sex offenses against more than one victim
667.61(e)(5)	Felony sex offenses -tying or binding of victim or another person
667.8	Kidnap to commit sex offense
667.85	Kidnap child under 14 yrs
674	Sex offense by daycare provider
836.6(c)	Escape from custody by force or violence
4500	Assault by a life prisoner
4501	Assault by a state prisoner
4501.1(a)	Aggravated battery
4501.5	Battery on non-confined person by prisoner
4503	Holding of hostages; offense
4530(a)	Escape from custody by force and violence
4532(a)(2)	Escape from alternative custody by force or violence by person booked on misdemeanor
4532(b)(2)	Escape from alternative custody by force or violence by person booked on felony
11413(a)	terrorism by explosion
11413(b)	terrorism by explosion (specified places)
11418(b)	weapons of mass destruction: use and damage to life
11418(c)	weapons of mass destruction: use and damage to public natural resources
11418(d)	weapons of mass destruction: creation of new pathogens
18740	Use of destructive device and explosive to injure/destroy
18745	Explosion with intent to murder
18750	Explosion of destructive device causing bodily injury
18755	Explosion causing death, mayhem, GBI

26100(c)	Discharge of firearm at another person from motor vehicle
18540(a)	Use of firearm to intimidate a voter
664/187(a)	Attempted murder?
664/211	Attempted robbery
Veh Code 2800.3(a)	SBI caused by flight from peace officer
Veh Code 2800.3(b)	Death caused by flight from peace officer

All attempts (PC 664), conspiracy (PC 182), solicitation (PC 653f), and accessory (PC 31) only if before the act of any of the offenses identified here also meet the definition of a violent offense for purposes of administering the PSA.

Appendix C.

Alameda VPRAI-R AUC race comparison

```
        DeLong's test for two ROC curves

data:  rocW_FTA and rocB_FTA
D = 2.0838, df = 1058.3, p-value = 0.03742
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6938090   0.6318229


        DeLong's test for two ROC curves

data:  rocW_FTA and rocH_FTA
D = -0.91113, df = 1069.5, p-value = 0.3624
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6938090   0.7222043


        DeLong's test for two ROC curves

data:  rocB_FTA and rocH_FTA
D = -3.2746, df = 1582.9, p-value = 0.001081
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6318229   0.7222043


        DeLong's test for two ROC curves

data:  rocW_newarrest and rocB_newarrest
D = 2.6699, df = 1010.6, p-value = 0.007709
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7382696   0.6639831


        DeLong's test for two ROC curves

data:  rocW_newarrest and rocH_newarrest
D = -1.28, df = 981.43, p-value = 0.2009
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7382696   0.7743334


        DeLong's test for two ROC curves

data:  rocB_newarrest and rocH_newarrest
D = -4.6036, df = 1645.4, p-value = 4.47e-06
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6639831   0.7743334


        DeLong's test for two ROC curves

data:  rocW_newfiling and rocB_newfiling
D = 2.2664, df = 1058.3, p-value = 0.02363
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7159698   0.6439860


        DeLong's test for two ROC curves

data:  rocW_newfiling and rocH_newfiling
D = 0.63518, df = 1056.2, p-value = 0.5254
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7159698   0.6950223
```

```
            DeLong's test for two ROC curves

data:  rocB_newfiling and rocH_newfiling
D = -1.7517, df = 1600.5, p-value = 0.08002
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6439860   0.6950223


            DeLong's test for two ROC curves

data:  rocW_newconviction and rocB_newconviction
D = 1.3905, df = 1043.2, p-value = 0.1647
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6973480   0.6419329


            DeLong's test for two ROC curves

data:  rocW_newconviction and rocH_newconviction
D = 0.39846, df = 1003.9, p-value = 0.6904
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6973480   0.6812731


            DeLong's test for two ROC curves

data:  rocB_newconviction and rocH_newconviction
D = -1.1225, df = 1647.1, p-value = 0.2618
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6419329   0.6812731


            DeLong's test for two ROC curves

data:  rocW_newviolent and rocB_newviolent
D = 0.4722, df = 887.72, p-value = 0.6369
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.5726593   0.5533247


            DeLong's test for two ROC curves

data:  rocW_newviolent and rocH_newviolent
D = -1.1231, df = 990.91, p-value = 0.2617
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.5726593   0.6217046


            DeLong's test for two ROC curves

data:  rocB_newviolent and rocH_newviolent
D = -1.9567, df = 1511.5, p-value = 0.05056
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.5533247   0.6217046


            DeLong's test for two ROC curves

data:  rocW_newpretrial and rocB_newpretrial
D = 3.0723, df = 1013.5, p-value = 0.002181
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7406025   0.6540237
```

```
        DeLong's test for two ROC curves

data:  rocW_newpretrial and rocH_newpretrial
D = -1.363, df = 963.41, p-value = 0.1732
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7406025   0.7790916


        DeLong's test for two ROC curves

data:  rocB_newpretrial and rocH_newpretrial
D = -5.217, df = 1664.1, p-value = 2.047e-07
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6540237   0.7790916
```

Alameda VPRAI-R AUC gender comparison

```
        DeLong's test for two ROC curves

data:  rocW_FTA and rocM_FTA
D = -0.51872, df = 539.8, p-value = 0.6042
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6689933   0.6853204


        DeLong's test for two ROC curves

data:  rocW_newarrest and rocM_newarrest
D = -2.3748, df = 528.97, p-value = 0.01791
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6679712   0.7364995


        DeLong's test for two ROC curves

data:  rocW_newfiling and rocM_newfiling
D = -1.5693, df = 499.71, p-value = 0.1172
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6298071   0.6884512


        DeLong's test for two ROC curves

data:  rocW_newconviction and rocM_newconviction
D = -1.4055, df = 476.98, p-value = 0.1605
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6074026   0.6770612


        DeLong's test for two ROC curves

data:  rocW_newviolent and rocM_newviolent
D = 0.47028, df = 531.64, p-value = 0.6384
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.5924716   0.5728883


        DeLong's test for two ROC curves

data:  rocW_newpretrial and rocM_newpretrial
D = -2.7918, df = 528.34, p-value = 0.005432
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6564110   0.7373879
```