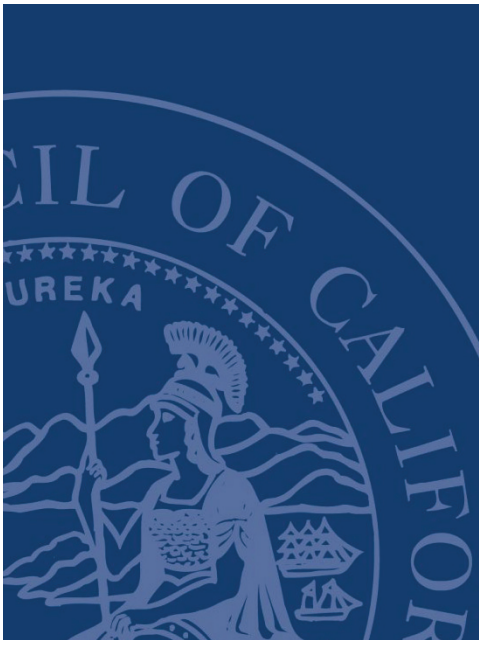

Pretrial Risk Assessment Tool Validation

PRETRIAL PILOT PROGRAM

COUNTY OF VENTURA

JULY 2022

JUDICIAL COUNCIL
OF CALIFORNIA

OPERATIONS AND PROGRAMS DIVISION
CRIMINAL JUSTICE SERVICES

Impact of the COVID-19 PANDEMIC on the Pretrial Pilot Program

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 time 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.

VENTURA ORAS 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 ORAS tool in Ventura. This year the sample size in Ventura was large enough to include analyses of predictive bias by race/ethnicity and gender. The study examines data from covering the period from October 1, 2019 to December 31, 2021.

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 (Stats. 2019, ch. 589). In AB 74, the Legislature directed the Judicial Council to administer pretrial projects in the 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 the Pretrial Pilot Program, including, but not limited to "…(e) 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 ORAS pretrial risk assessment tool used by Ventura.

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

> *"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.*

VALIDATION METHODS

Descriptive statistics are presented, exploring basic features of the data such as demographics and showing 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.

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

- Failure to appear (FTA)
- New arrest
- New filing
- New conviction
- New violent arrest
- FTA or new arrest (composite measure)

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.

For criminal justice risk assessments, a common metric for evaluating AUC values is derived from Desmarais and Singh (2013),[1] 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 used to test whether risk scores significantly predict the likelihood of each outcome of interest and whether any of the differences in outcomes by risk level across gender or race/ethnicity are statistically significant. 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.

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

This report analyzes risk scores and associated outcomes for individuals who were released from custody pretrial. Individuals may have been released in a variety of ways by a Sheriff or judge, 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 tool's risk factors or weights that can further improve the predictive power of the tool.

[1] 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*.

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.[2]
- **New filing** is any new arrest during the pretrial period that results in charges filed with the court and reported to the CA DOJ.[3]
- **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.[4]
- **New violent arrest** is any new arrest during the pretrial period for an offense on the list of PSA Pretrial Pilot consensus violent offense list, which includes felonies and misdemeanors of a violent nature. For the full list of offenses see Appendix A.
- **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. Ventura's sample size was sufficient for general validation results and for analyses of predictive bias by gender and race/ethnicity for Hispanic and White groups.

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**: Ventura sheriff's office provided information on all individuals booked into the local county jail, including booking dates, charges, and releases.
- **Probation data**: Ventura probation department performed pretrial assessment services and provided pretrial risk assessment information, including assessment dates, scores, and recommendation for those assessed.

[2] New criminal offenses are defined in four ways to capture different outcomes of interest. All new criminal offense indicators are measured using data from the California Department of Justice (CA DOJ).
[3] 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.
[4] Because of 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 result in a conviction.

- **Court case data**: Ventura 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 October 1, 2019 to December 31, 2021.

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. Local justice agencies keep separate data systems, and not all data could be matched across agencies. 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 also 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."

Ventura's data contained 7,056 ORAS risk assessments that were scored. The assessed bookings column shows the number of bookings (6,664) 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 (3,834), 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 (2,440) used for the analysis, shows the number of bookings with associated assessment scores and a final disposition who were released during the pretrial period.

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
ORAS	Ventura	7,056	6,664	3,834	2,440	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. The evaluation sample was majority Hispanic (58%), and a smaller share white (33%), and Black (6%). The evaluation sample was predominantly male (77%),[5] and the median age was 34 years old.

Table 2. Demographic Profile of Evaluation Data Frame

		Race/Ethnicity (%)				Gender (%)		
County	Total	Black	White	Hispanic	Other	Male	Female	Median Age
Ventura	2,440	6	33	58	3	77	23	34

ARREST OFFENSES

Table 3 shows that felony arrests represented the majority of bookings (79%) while misdemeanor arrests were a smaller share (21%). Violent offenses[6] represented 35% of bookings in the dataset, while property offenses were 17% and drug offenses 19% of bookings in the dataset. DUI offenses represented 5% of bookings, while DV offenses made up 38% 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
Ventura	79	21	35	17	19	5	38

[5] Non-binary, other, and unknown genders represented less than 0.1% of the bookings in the evaluation dataset.
[6] Violent offenses as defined by the pilot consensus PSA Violent Offense List, see Appendix B. These include both felonies and misdemeanors that are violent in nature.

ADVERSE OUTCOMES

Several different adverse outcomes are measured during the pretrial period from pretrial release to disposition (Table 4). Failure to appear (FTA), measured as bench warrants issued for FTA during the pretrial period, were recorded for 20.1% of pretrial observations. New arrests during the pretrial period were recorded for 38.1% of pretrial observations. New arrests during the pretrial period resulting in filed charges were recorded for 15.6% of pretrial observations, and new arrests during the pretrial period resulting in convictions were recorded for 12.7% of pretrial observations.[7] New violent arrests[8] — including felony and misdemeanor arrests for offenses of a violent nature— were recorded during the pretrial period for 8.2% of pretrial observations.

Table 4. Rates of Pretrial Misconduct in Evaluation Data Frame

County	FTA	New Arrest	New Filing	New Conviction	New Violent Arrest
Ventura	20.1	38.1	15.6	12.7	8.2

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 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.

VENTURA ORAS VALIDATION

GENERAL VALIDATION

Figure 1 shows the full distribution of risk levels for individuals in the evaluation dataset assessed with the ORAS tool. The ORAS tool developer divided the risk scores into 3 risk levels: the first level includes scores 0 to 2, the second level includes scores 3 to 5, and the third level includes scores 6 to 9.[9] Risk level 2 (scores 3-5) was the most assessed risk level in the evaluation dataset. The distribution of all

[7] 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.

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

[9] ORAS tool development, Latessa et al 2009.

assessed individuals may differ from the distribution in the evaluation dataset[10] because the evaluation dataset only includes released individuals with concluded pretrial periods.

Figure 1. Distribution of ORAS Risk Scores

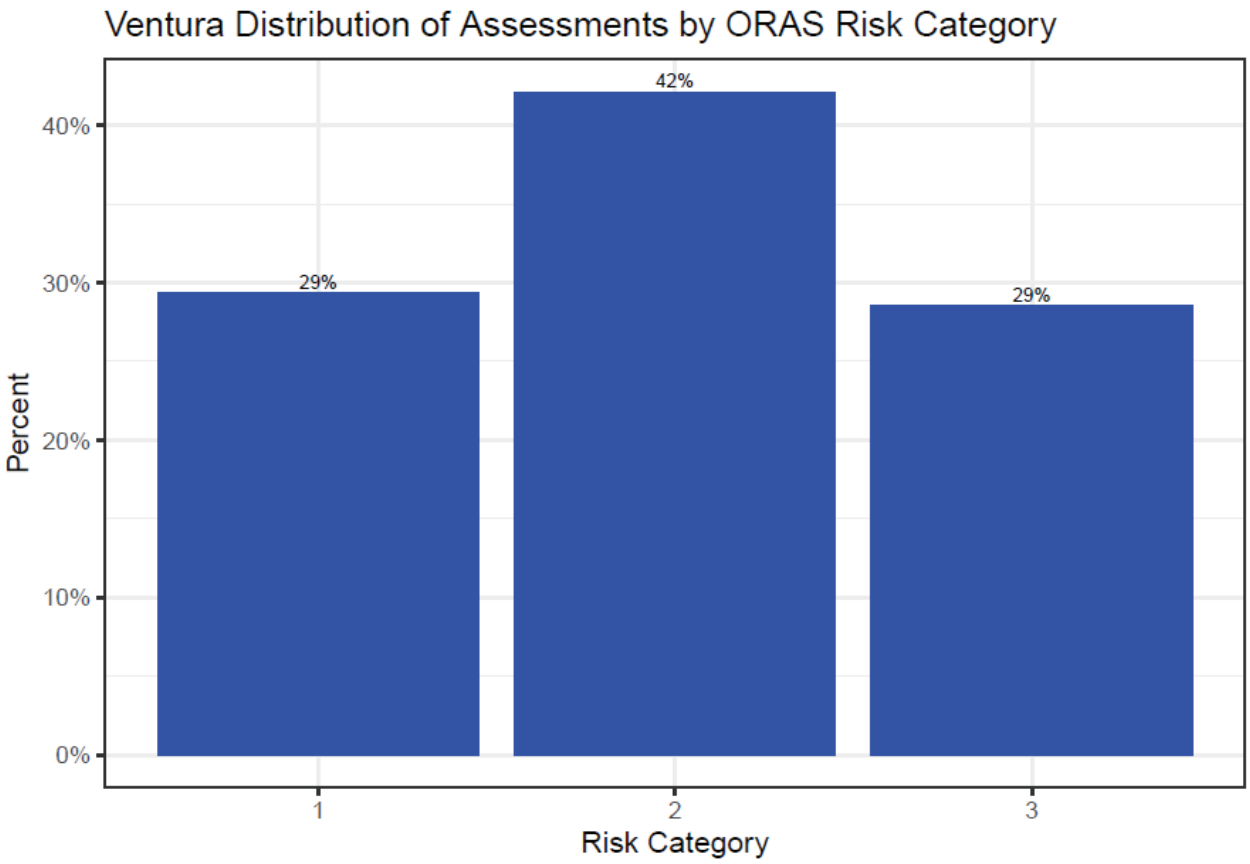

Table 5. Counts of Individuals by ORAS Risk Scores

ORAS Risk Level	Total
1	716
2	1,028
3	696

[10] For full risk distribution of all individuals assessed, see SB 36 report https://www.courts.ca.gov/sb36.htm.

Table 6 shows the AUC value for the ORAS tool, using the 3 established 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),[11] 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 ORAS are excellent for new arrest, new filing, new conviction, and the combined measure of "FTA or New Arrest", good for FTA, 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	0.658	0.633-0.682
New Arrest	0.727	0.708-0.746
New Filing	0.719	0.694-0.744
New Conviction	0.721	0.693-0.749
New Violent Arrest	0.631	0.596-0.667
FTA or New Arrest	0.715	0.695-0.734
N = 2440		

Figure 2 shows the rate of various adverse outcomes during the pretrial period at each risk level of the ORAS. For each outcome of interest,[12] observed rates of the outcome increase consistently as the assessed risk level increases. The ORAS tool was specifically designed to predict a combination of the risk of failure to appear in court and the risk of a new arrest.

[11] 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*.

[12] See validation methodology section for definitions of each outcome of interest.

Figure 2. ORAS Outcomes by Risk Category

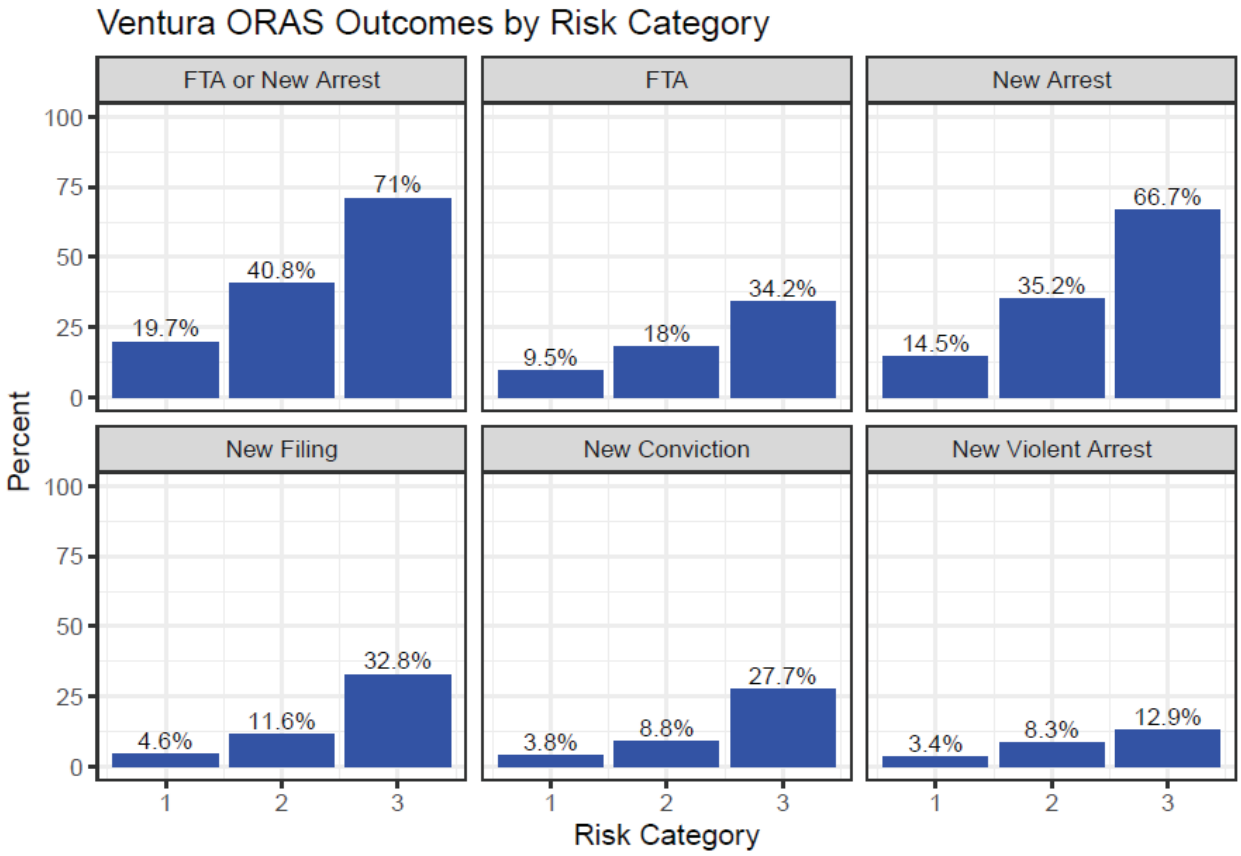

Table 7 shows the results from logistic regression models predicting each outcome of interest. The models control for the number of days the defendant spent released during the pretrial period. For each outcome of interest, the models show that the ORAS risk score is statistically significantly ($p<0.001$) associated with the likelihood of all outcomes during the pretrial period, as is the number of days an individual spends on release.

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)
ORAS Risk Score	0.814***	1.266***	1.288***	1.259***	0.629***	1.192***
	(0.075)	(0.068)	(0.096)	(0.102)	(0.105)	(0.066)
Days Released	0.004***	0.003***	0.005***	0.005***	0.004***	0.004***
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0003)
Constant	−3.808***	−3.582***	−5.578***	−5.648***	−4.463***	−3.221***
	(0.192)	(0.163)	(0.266)	(0.283)	(0.269)	(0.155)
Observations	2,440	2,440	2,440	2,440	2,440	2,440
Log Likelihood	−1,066.336	−1,343.729	−815.795	−744.742	−625.602	−1,388.382
Akaike Inf. Crit.	2,138.671	2,693.458	1,637.589	1,495.485	1,257.204	2,782.765
Note:						*p<0.05; **p<0.01; ***p<.001

ANALYSIS OF BIAS

RACE

Figure 3 shows the distribution of ORAS risk assessment scores by race/ethnicity, and table 8 shows that the number of assessed individuals is sufficient to run statistical tests that look at how the ORAS tool scales performed by race/ethnicity for the White and Hispanic groups.

Figure 3. Distribution of Risk Scores by Race/Ethnicity

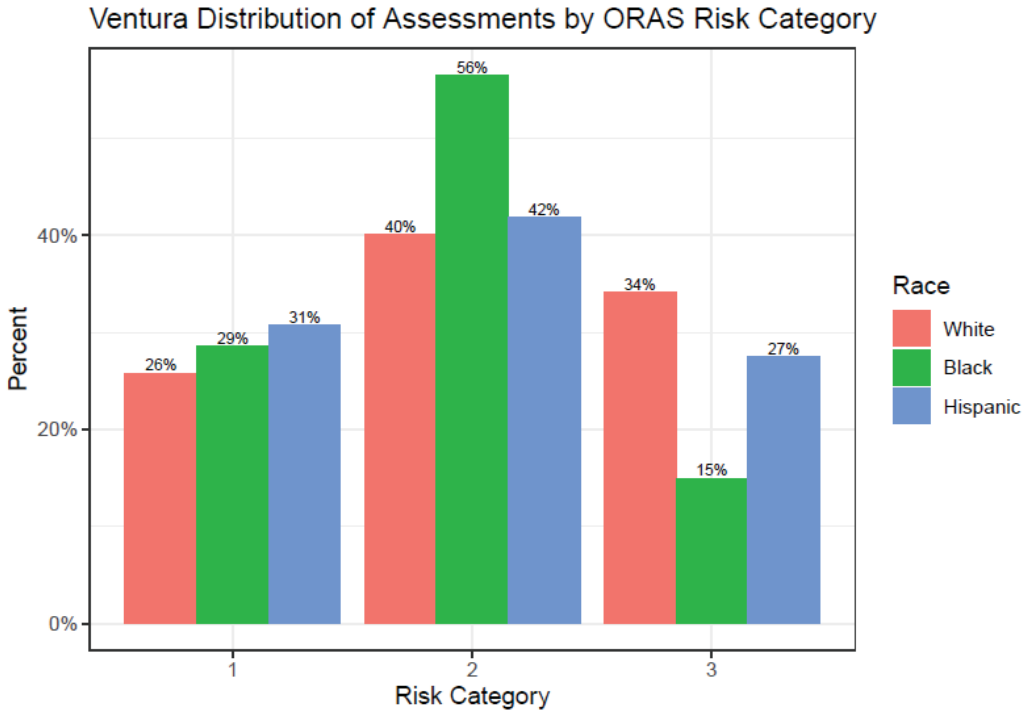

Table 8. Count of Individuals by ORAS Risk Scores and Race/Ethnicity

ORAS Risk Score	White	Black	Hispanic
1	207	42	432
2	322	83	589
3	274	22	387

Table 9 shows the AUC values[13] and 95% confidence intervals for each outcome of interest for the White and Hispanic race/ethnicity groups. Except for the AUC values for new violent arrest, which are in the fair range, all other AUC values are in the good to excellent range. No statistically significant differences in AUC by race/ethnicity were found[14].

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

	AUC		CI (95%)	
Outcome	White	Hispanic	White	Hispanic
FTA	0.661	0.653	0.619-0.703	0.62-0.686
New Arrest	0.733	0.718	0.701-0.765	0.692-0.743
New Filing	0.739	0.694	0.701-0.778	0.659-0.73
New Conviction	0.729	0.705	0.686-0.772	0.667-0.742
New Violent Arrest	0.618	0.628	0.559-0.677	0.582-0.673
FTA or New Arrest	0.735	0.702	0.703-0.767	0.676-0.727

N White = 803 , N Hispanic = 1408

Figure 4 shows the results of statistical models of the predictive power of the relevant ORAS scale 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 White and Hispanic 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 intervals are notably

[13] See page 9 for description of the meaning of AUC values.
[14] See Appendix C for DeLong's test for two ROC curves.

wider for new violent arrest due to the small sample size, which diminishes the ability of the models to make precise predictions for this specific outcome.

Figure 4. Comparison of Racial/Ethnic Differences in Logistic Regression Curves

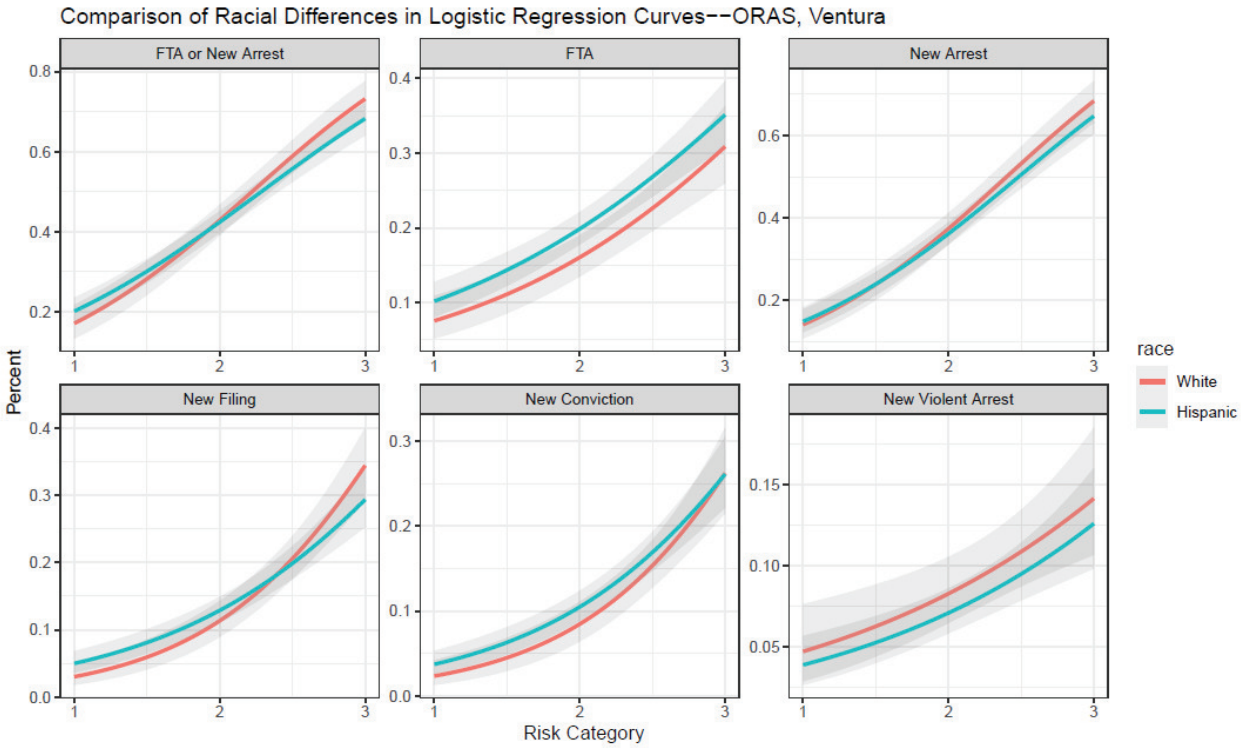

Table 10 shows the results of a logistic regression, which predicts each outcome of interest by the relevant ORAS risk score, race, and number of days spent released. This statistical test compares Hispanic individuals with White individuals. The ORAS risk score is a statistically significant ($p<0.001$) predictor of all outcomes of interest. The number of days an individual was out on release is also a statistically significant predictor of all outcomes of interest, indicating that the longer an individual spends on release, the more likely the individual is to experience these outcomes.

Hispanic ethnicity is a statistically significant ($p<0.05$) predictor for FTA. For FTA, Hispanic ethnicity has a positive coefficient, indicating that Hispanic individuals had a higher probability of an FTA when compared to White individuals with the same risk score. Hispanic ethnicity was not a statistically significant predictor for any other outcome 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 Arrest
	(1)	(2)	(3)	(4)	(5)	(6)
ORAS Risk Score	0.809***	1.236***	1.235***	1.213***	0.582***	1.182***
	(0.079)	(0.070)	(0.100)	(0.107)	(0.110)	(0.068)
Race:Hispanic	0.282*	−0.079	−0.004	0.165	−0.134	−0.055
	(0.121)	(0.102)	(0.137)	(0.147)	(0.164)	(0.101)
Days Released	0.004***	0.003***	0.005***	0.005***	0.004***	0.004***
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0003)
Constant	−4.017***	−3.448***	−5.452***	−5.657***	−4.279***	−3.160***
	(0.227)	(0.185)	(0.296)	(0.318)	(0.305)	(0.177)
Observations	2,211	2,211	2,211	2,211	2,211	2,211
Log Likelihood	−963.795	−1,227.879	−749.844	−682.428	−571.113	−1,257.641
Akaike Inf. Crit.	1,935.589	2,463.758	1,507.687	1,372.857	1,150.225	2,523.281
Note:						*p<0.05; **p<0.01; ***p<.001

Table 11 shows the results of a logistic regression model which predicts each outcome of interest by the relevant ORAS scale risk score, race, the interaction between race and the ORAS risk score, and number of days spent released. Risk score is a statistically significant predictor ($p<0.001$) of each outcome of interest, as is the number of days released. This statistical test again compares Hispanic individuals with White individuals. However, there are no statistically significant interactions between Hispanic ethnicity and the relevant ORAS scale risk scores on any of the outcomes of interest. In the absence of a statistically significant interaction, the above model with no interaction is more appropriate to demonstrate the impact of Hispanic ethnicity.

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 Arrest
	(1)	(2)	(3)	(4)	(5)	(6)
ORAS Risk Score	0.831***	1.298***	1.500***	1.364***	0.538**	1.318***
	(0.139)	(0.117)	(0.178)	(0.193)	(0.175)	(0.116)
Race:Hispanic	0.360	0.133	0.975	0.720	−0.300	0.392
	(0.409)	(0.332)	(0.544)	(0.597)	(0.545)	(0.318)
Days Released	0.004***	0.003***	0.005***	0.005***	0.004***	0.004***
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0003)
ORAS*Hispanic	−0.034	−0.098	−0.399	−0.223	0.072	−0.212
	(0.169)	(0.145)	(0.212)	(0.231)	(0.225)	(0.143)
Constant	−4.071***	−3.586***	−6.119***	−6.042***	−4.177***	−3.452***
	(0.352)	(0.277)	(0.481)	(0.523)	(0.439)	(0.269)
Observations	2,211	2,211	2,211	2,211	2,211	2,211
Log Likelihood	−963.775	−1,227.651	−748.031	−681.954	−571.062	−1,256.527
Akaike Inf. Crit.	1,937.549	2,465.303	1,506.061	1,373.907	1,152.124	2,523.054
Note:						*p<0.05; **p<0.01; ***p<.001

GENDER

Figure 5 shows the distribution of risk assessment scores by gender. The distribution of risk scores between men and women is similar.

Figure 5. Distribution of Risk Scores by Gender

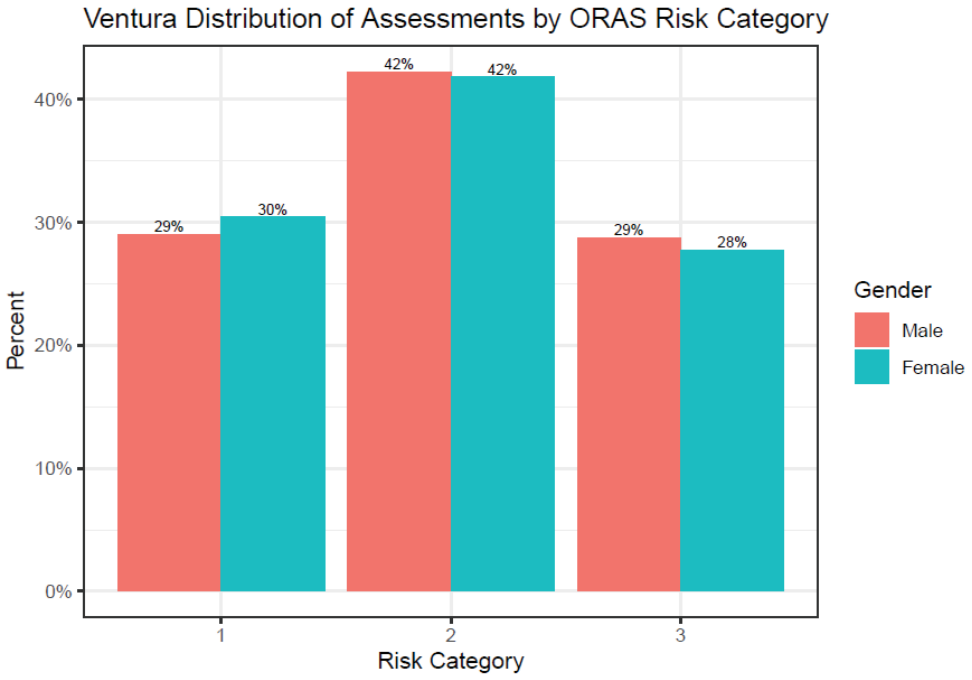

Table 12. Count of Individuals by ORAS Risk Scores and Gender

ORAS Risk Score	Male	Female
1	547	169
2	796	232
3	542	154

The number of assessed individuals in each gender group is sufficient to run statistical tests that look at how the ORAS tool scales performed by gender.

Table 13 shows the AUC value[15] and 95% confidence intervals for each outcome of interest and relevant ORAS risk scales separately for men and women. With the exception of the male AUC value for new violent arrest, which falls in the fair range, all other AUC values are in the good to excellent range. Statistical testing[16] indicates that there are no statistically significant differences in AUC between men and women for all outcomes of interest.

Table 13. AUC values for Outcomes of Interest by Gender

	AUC		CI (95%)	
Outcome	Female	Male	Female	Male
FTA	0.648	0.660	0.594-0.702	0.632-0.688
New Arrest	0.702	0.734	0.659-0.744	0.713-0.755
New Filing	0.698	0.724	0.634-0.763	0.696-0.752
New Conviction	0.706	0.725	0.634-0.777	0.695-0.755
New Violent Arrest	0.651	0.626	0.58-0.722	0.585-0.667
FTA or New Arrest	0.706	0.717	0.665-0.748	0.696-0.739

N Female = 555 , N Male = 1885

Figure 6 show the results of statistical models of the predictive power of the relevant ORAS scale for each outcome of interest for women as compared to men. Each line represents the probability of each outcome of interest at each risk level separately by 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 9 for description of the meaning of AUC values.
[16] See Appendix C for DeLong's test for two ROC curves.

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. For the combined measure of "FTA or New Arrest," FTA, new arrest and new violent arrest, the confidence intervals of the lines for men and women 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. For new violent arrest outcome, the confidence intervals of men and women are notably wider, especially for women, and are overlapping.

For new filing and new conviction outcomes, the lack overlap between the confidence intervals at the mid- to high- range of the tool indicates evidence that women had lower rates of new filing and new conviction during the pretrial period as compared to men with the same risk score.

Figure 6. Comparison of Gender Differences in Logistic Regression Curves

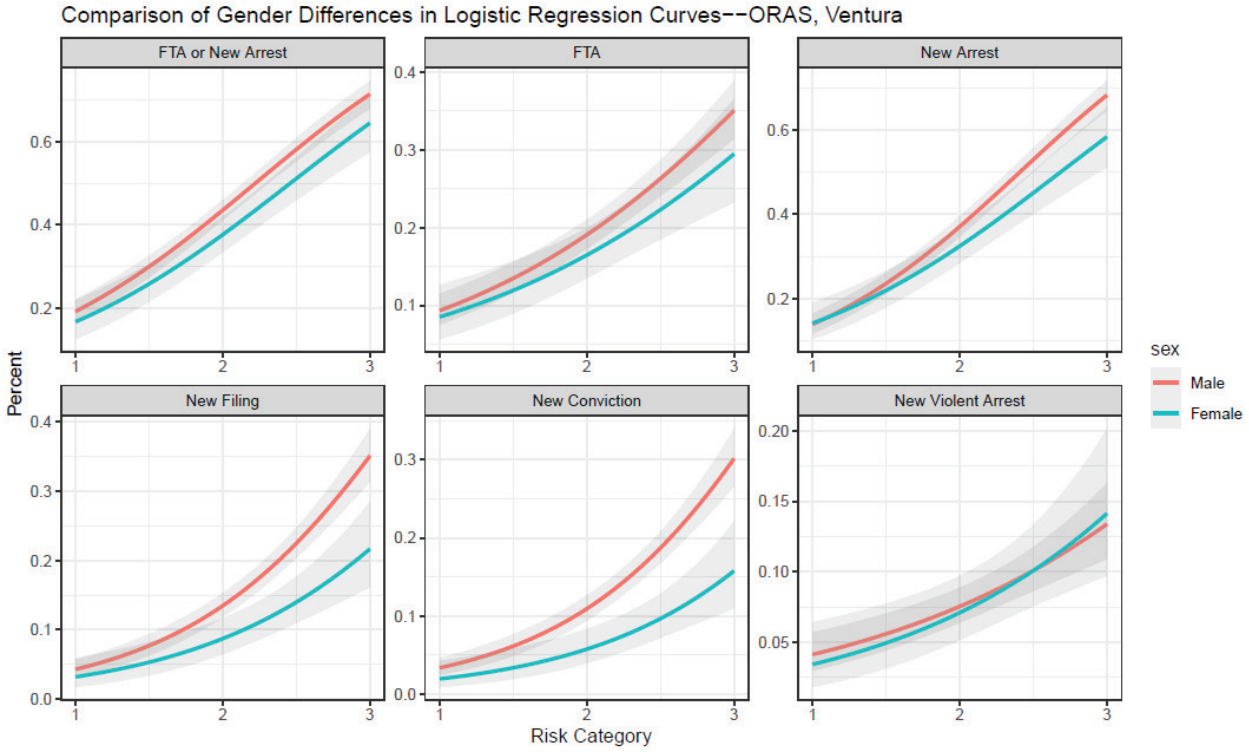

Table 14 shows the results of a logistic regression which predicts each outcome of interest by the relevant ORAS scale risk score, gender, and number of days spent released. This statistical test compares women with the base group of men. Risk level on the relevant ORAS scale is, in each case, a statistically significant ($p<0.001$) predictor of the outcome of interest. The number of days the individual was out on release was also 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 the outcome of interest.

Female gender is a statistically significant predictor ($p<0.001$) of new filing and new conviction outcomes. The negative coefficients for these outcomes indicate that women are statistically

significantly less likely to experience new filing and new conviction outcomes as compared to men with the same risk score.

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 Arrest
	(1)	(2)	(3)	(4)	(5)	(6)
ORAS Risk Score	0.814***	1.267***	1.293***	1.265***	0.629***	1.193***
	(0.075)	(0.068)	(0.096)	(0.103)	(0.105)	(0.066)
Female	−0.111	−0.184	−0.505**	−0.703***	0.082	−0.191
	(0.134)	(0.114)	(0.167)	(0.188)	(0.184)	(0.111)
Days Released	0.004***	0.003***	0.005***	0.005***	0.004***	0.004***
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0003)
Constant	−3.782***	−3.540***	−5.488***	−5.529***	−4.485***	−3.178***
	(0.195)	(0.165)	(0.268)	(0.285)	(0.274)	(0.157)
Observations	2,440	2,440	2,440	2,440	2,440	2,440
Log Likelihood	−1,065.991	−1,342.408	−810.954	−736.981	−625.503	−1,386.895
Akaike Inf. Crit.	2,139.983	2,692.816	1,629.907	1,481.963	1,259.007	2,781.791

Note: *p<0.05; **p<0.01; ***p<.001

Table 15 shows the results of a logistic regression models which predicts each outcome of interest by the relevant ORAS scale risk score, gender, the interaction between gender and the ORAS risk score, and number of days spent released. Risk score and the number of days spent released are statistically significant predictors ($p<0.001$) of each outcome of interest. This statistical test again compares women with men as the base group. The results indicate that there is no statistically significant interaction between gender and risk score for all outcomes of interest. In the absence of a statistically significant interaction, the above model with no interaction is more appropriate to demonstrate the impact of gender.

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 Arrest
	(1)	(2)	(3)	(4)	(5)	(6)
ORAS Risk Score	0.826***	1.320***	1.321***	1.281***	0.590***	1.212***
	(0.085)	(0.078)	(0.106)	(0.111)	(0.119)	(0.075)
Female	−0.039	0.084	−0.279	−0.544	−0.152	−0.100
	(0.264)	(0.213)	(0.384)	(0.456)	(0.386)	(0.202)
Days Released	0.004***	0.003***	0.005***	0.005***	0.004***	0.004***
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0003)
ORAS*Female	−0.058	−0.231	−0.159	−0.108	0.181	−0.083
	(0.184)	(0.158)	(0.246)	(0.285)	(0.258)	(0.154)
Constant	−2.983***	−2.334***	−4.232***	−4.286***	−3.807***	−2.005***
	(0.140)	(0.116)	(0.193)	(0.203)	(0.198)	(0.108)
Observations	2,440	2,440	2,440	2,440	2,440	2,440
Log Likelihood	−1,065.942	−1,341.354	−810.748	−736.911	−625.253	−1,386.751
Akaike Inf. Crit.	2,141.884	2,692.708	1,631.497	1,483.821	1,260.506	2,783.502

Note: *p<0.05; **p<0.01; ***p<.001

APPENDIX A

Table 1. Ohio Risk Assessment System: Pretrial Assessment Tool (ORAS-PAT): Factorsand Weights

Risk Factor	Response	Weight
Age at First Arrest	33 or Older	**0**
	Under 33	**1**
Number of Failure-to-Appear Warrants in Past 24 Months	None	**0**
	One Warrant for FTA	**1**
	Two or More FTA Warrants	**2**
Three or More Prior Jail Incarcerations	No	**0**
	Yes	**1**
Employed at the Time of Arrest	Yes, Full-time	**0**
	Yes, Part-time	**1**
	Not Employed	**2**
Residential Stability	Lived at Current Residence for Past Six Months	**0**
	Not Lived at Same Residence	**1**
Illegal Drug Use During Past Six Months	No	**0**
	Yes	**1**
Severe Drug Use Program	No	**0**
	Yes	**1**
Point Range		**0–9**

Source: *Creation and Validation of the Ohio Risk Assessment System: Final Report*, University of Cincinnati School of Criminal Justice, Center for Criminal Justice Research (2009)

APPENDIX B

Table B1. PSA Violent Offense List

PC CODE	Description
69	Obstructing or resisting exec officer in performance of duty; threats, force, or violence
136.1(c)(1)	Intimatidating/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

AUC Comparison Results

Ventura ORAS AUC race comparison

```
        DeLong's test for two ROC curves

data:  rocW_FTA and rocH_FTA
D = 0.2922, df = 1703.5, p-value = 0.7702
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6610781   0.6531093


        DeLong's test for two ROC curves

data:  rocW_newarrest and rocH_newarrest
D = 0.75261, df = 1759.3, p-value = 0.4518
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7332624   0.7175297


        DeLong's test for two ROC curves

data:  rocW_newfiling and rocH_newfiling
D = 1.6835, df = 1944.8, p-value = 0.09243
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7393141   0.6944177


        DeLong's test for two ROC curves

data:  rocW_newconviction and rocH_newconviction
D = 0.82354, df = 1858, p-value = 0.4103
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7290291   0.7049175


        DeLong's test for two ROC curves

data:  rocW_newviolent and rocH_newviolent
D = -0.2602, df = 1688.8, p-value = 0.7947
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6177839   0.6276947


        DeLong's test for two ROC curves

data:  rocW_newpretrial and rocH_newpretrial
D = 1.6025, df = 1760.4, p-value = 0.1092
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7350510   0.7016126
```

Ventura ORAS AUC gender comparison

```
        DeLong's test for two ROC curves

data:  rocW_FTA and rocM_FTA
D = -0.3936, df = 875.71, p-value = 0.694
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6478252   0.6600325


        DeLong's test for two ROC curves

data:  rocW_newarrest and rocM_newarrest
D = -1.3207, df = 850.34, p-value = 0.187
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7019256   0.7339744


        DeLong's test for two ROC curves

data:  rocW_newfiling and rocM_newfiling
D = -0.71946, df = 767.72, p-value = 0.4721
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6982470   0.7240003


        DeLong's test for two ROC curves

data:  rocW_newconviction and rocM_newconviction
D = -0.47308, df = 759.27, p-value = 0.6363
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7058461   0.7245609


        DeLong's test for two ROC curves

data:  rocW_newviolent and rocM_newviolent
D = 0.59124, df = 945.21, p-value = 0.5545
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.6506849   0.6260022


        DeLong's test for two ROC curves

data:  rocW_newpretrial and rocM_newpretrial
D = -0.44697, df = 877.31, p-value = 0.655
alternative hypothesis: true difference in AUC is not equal to 0
sample estimates:
AUC of roc1 AUC of roc2
  0.7064364   0.7170457
```