

The County of El Paso, Texas

# Assessing Risk Among Pretrial Defendants in El Paso County

Validation of the El Paso Pretrial Risk Assessment Instrument  
and Revision Recommendations

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## Executive Summary

El Paso County implemented a modified version of the 2003 Virginia Pretrial Risk Assessment Instrument (VPRAI) on January 1st, 2016. The El Paso Pretrial Risk Assessment (EPPRA) instrument is used as part of the pretrial process to provide information regarding defendant's risk of missing a scheduled court hearing or reflecting a danger to the community through having a new charge during the pre-trial period. The Criminal Justice Coordination (CJC) Department has a mission to enhance pretrial justice and to provide quality justice services. The primary justice interests of the CJC are enhancing public safety, court appearance rates and the efficient and effective use of the jail. The County commissioned this report to assess the EPPRA's predictive validity and to identify areas of improvement.

The findings are as follows:

***The El Paso County Criminal Justice Coordination (CJC) Department's risk assessment tool was found to predict success or failure pending trial as demonstrated in the multivariate analyses.***

- The majority of pretrial cases are successful; no missed court hearings resulting in a warrant, not having a new arrest, nor violating release guidelines. Of the 1,601 cases reviewed, 68.2% had no pretrial failure.
- Risk levels in place overall reflect increased failure with increased risk level (Table 4).
- Not all individual risk factors are predictive of failure, prompting additional analysis to modify the risk assessment for improved performance in assessing not just overall success or failure but individual pretrial failure outcomes.

***The original El Paso Pretrial Risk Assessment is statistically valid for all pretrial outcome failures.***

- While only certain individual risk items were found to be statistically significant for each pretrial outcome failure, as a whole, the EPPRA significantly predicts the likelihood of:
  - being issued a warrant for failing to appear to a court date,
  - being issued a warrant for failing to comply with supervision conditions,
  - being arrested due to a charge of committing a new non-violent crime,
  - being arrested due to a charge of committing a new violent crime,
  - being arrested due to a charge of committing any new crime, and
  - any pretrial failure, defined as the occurrence of any of the above
- The following risk factors significantly predict the likelihood of any pretrial failure:
  - Living at current residence less than one year
  - Currently under supervision
  - More than one prior violent conviction
  - Current pending charge
  - Unemployed within six months
  - Under 18.5 years of age at the time of booking
- The following risk factors significantly predict the likelihood of being issued a warrant for failing to appear to a scheduled court date:
  - Living at current residence less than one year

- The following risk factors significantly predict the likelihood of being arrested due to a charge of committing a new non-violent crime during the pretrial period:
  - Living at current residence less than one year
  - More than one prior violent conviction
  - Current pending charge
  - Under 18.5 years of age at the time of booking
- The following risk factors significantly predict the likelihood of being arrested due to a charge of a new violent crime during the pretrial period:
  - Currently under supervision
  - More than one prior violent conviction
  - Under 18.5 years of age at the time of booking
- The following risk factors significantly predict the likelihood of being arrested due to a charge of committing any new crime:
  - Living at current residence less than one year
  - Currently under supervision
  - More than one prior warrant for failing to appear
  - More than one prior violent conviction
  - Current pending charge
  - Under 18.5 years of age at the time of booking
- The risk items *Current felony or violent misdemeanor charge* and *Outstanding warrants in other jurisdictions* were not found to significantly predict any pretrial failure, and are eliminated from the EPPRA-Revised.
- The risk item *Under 18.5 years of age at the time of booking* is a new risk item in the EPPRA-R.
- Due to the small sample size of defendants who were released on pretrial supervision, no risk items were found to be significantly predictive of failing to comply; more data must be analyzed before a risk score for FTC can be established.
- Like the original EPPRA, the EPPRA-R will score one point of every risk item; the EPPRA-R's risk scores will thus range from 0 to 6 points.

***Days spent in jail is related to pretrial failure***

- There is a significant difference in pretrial failure between defendants released within 5-8 days and defendants released 9-15 days.
- Defendants released within 8 days are less likely to receive a warrant for committing a pretrial offense than those who are not.
- A Level 1 defendant (lowest risk on EPPRA-R) held for more than 31 days in El Paso County jail is 24 times more likely to be arrested for pretrial failure than a defendant who is released within 8 days.

- Analysis does not find evidence for a decrease in likelihood to be charged with committing a new crime for all defendants held for 16-31 days or 32 or more days.
- If release recommendation considers the impact that days in jail has on the likelihood of FTA and being charged with a new crime, there is no statistical support in holding pretrial defendants longer than 2 days in relation to FTAs, and no statistical support in holding pretrial defendants longer than 8 days in relation to being charged with a new crime or being issued a warrant for any pretrial failure.

## Introduction

The El Paso County Criminal Justice Coordination (CJC) Department implemented a modified version of the Virginia Pretrial Risk Assessment Instrument (VPRAI) to be used in its pretrial services procedure (see Appendix on Page VPRAI Reference Risk Assessment 200343). The El Paso Pretrial Risk Assessment (EPPRA) instrument is used to identify a defendant's risk of pretrial failure (failure to appear for a scheduled court appearance or arrest for a new offense) if released on bond. The EPPRA was implemented in January 2016 and examines eight risk factors that reflect a total risk score. Defendants are assigned to one of five risk levels that represent the level of risk of pretrial failure. Pretrial staff interview defendants and provide the results of the EPPRA to the court to assist judges in granting or reconsidering release and supervision while defendants await disposition of their criminal charges.

El Paso County commissioned a report to analyze and evaluate the effectiveness of the EPPRA's predictive ability, and to modify the current tool based on the results of this research. This report describes the results of the retroactive validation of the EPPRA covering 1,842 cases from January to March 2016. Although emphasis of the current tool is on overall failure, this research project expanded the analysis to identify which risk items currently collected in the EPPRA had predictive power in regards to the following individual pretrial failure outcomes: failure to appear for a scheduled court appearance resulting in a warrant, failure to comply with supervised release conditions, arrest for a new non-violent offense, arrest for a new violent offense, and any new arrest.

This report first details the process followed by the CJC Department to assess the predictive utility of the EPPRA and the results of these analyses. This is followed by a proposed revised EPPRA with increased predictive power utilizing statistically significant risk items identified.

## Sample Description

The CJC Department provided physical risk assessment records starting from January 1, 2016 to March 31, 2016 (see Appendix for EPPRA example and scoring guidelines). It was determined that the scoring criteria placed by the department did not always match the scoring found in the risk assessments recorded by staff. Scoring errors that were identified included incorrect addition of scores and misinterpretation of scoring guidelines (i.e., a defendant with only one prior felony conviction receiving a point). In order to meet the goals of the current study of validating the risk assessment tool's predictive utility instead of the risk assessment implementation, data collection entailed reviewing each risk assessment and rescored appropriately. Associated court records and booking information were reviewed from Odyssey, the El Paso County criminal database system. Those records provided case details including, but not limited to, the corresponding days spent in jail before posting bond, the bond type and amount posted by the defendant, new jailings after release, and warrants issued due to missed court hearings or failing to comply with release conditions. Cases that were yet to be disposed at the time of data collection were excluded from the dataset as pretrial outcomes cannot be determined.

The final dataset includes 1,842 defendants; this includes all defendants who were interviewed using the EPPRA and whose pretrial period had concluded at the time of data collection. Of this dataset, 1,601 defendants were released from jail on bond, with the remaining 241 defendants having never been

released from jail on bond. Since it is impossible for these 241 defendants to fail any pretrial release outcome because they were never released on bond, this subpopulation is excluded from analyses. It is possible for the same defendant to appear more than once due to a rearrests post release within the three month window. These defendants were not considered duplicates as some risk factors in the EPPRA are dynamic, and risk scores can vary over time. This allows for the defendant to reflect a different risk profile and subsequent outcome.

Table 1. Booked and Released Sample Descriptives

		Booked		Released	
		Total		Total	
		N	%	N	%
EPPRA Risk Items					
Lived at Residence Less Than One Year	Yes	536	29%	437	27%
	No	1306	71%	1164	73%
Charge Type	Felony/Violent	783	43%	653	41%
	Misdemeanor	1059	57%	948	59%
Under Supervision	Yes	210	11%	156	10%
	No	1632	89%	1445	90%
Two or More Failures to Appear	Yes	26	2%	26	2%
	No	1575	98%	1575	98%
Two or More Violent Convictions	Yes	89	6%	89	6%
	No	1512	94%	1512	94%
Pending Charges	Yes	302	19%	302	19%
	No	1299	81%	1299	81%
Warrant From Other Jurisdictions	Yes	0	0%	0	0%
	No	1601	100%	1601	100%
Unstable Employment	Yes	852	53%	852	53%
	No	749	47%	749	47%
Total (N)		1842		1601	
Risk Levels					
Low Risk		823	45%	777	49%
Below Average Risk		619	34%	530	33%
Average Risk		296	16%	219	14%
Above Average Risk		87	5%	65	4%
High Risk		17	1%	10	1%
Sex					
Female		356	19%	339	21%
Male		1486	81%	1262	79%



	Booked		Released	
	Total		Total	
	N	%	N	%
<b>Age at Booking</b>				
Mean	30.7		30.3	
Standard Deviation	10.8		10.5	
Range	17 - 82		17 - 82	
<b>Outcomes</b>				
Failure to Appear				
Yes			169	11%
No			1432	89%
New Arrest				
Yes			352	22%
No			1249	78%
Failure to Comply				
Yes			138	9%
No			1463	91%
Any Failure				
Yes			509	32%
No			1092	68%

Note: During building of the dataset used for analysis, for some defendants different race/ethnicity was noted across different bookings; the fidelity of racial information in Odyssey is questionable and will be studied further during the next developmental phase of the EPPRA

Research Objective One: Test the predictive validity of the current EPPRA using descriptive, bivariate, and multivariate analysis.

The EPPRA instrument provides a risk score based on eight risk factors identified as predictive of failure to appear in court and/or danger to the community. Each risk item is assigned a point and the risk scores are grouped into five risk levels. Defendants who score 0 or 1 points are classified as Low Risk, defendants who score 2 points are classified as Below Average Risk, defendants who score 3 points are classified as Average Risk, defendants who score 4 points are classified as Above Average Risk, and defendants who score 5 points or higher are classified as High Risk.

Availability of risk item responses to all parties involved with the risk assessment through the pretrial process motivates an analysis of individual items. Bivariate analysis identifies which of the eight EPPRA risk factors are statistically significant ( $p \leq .05$ ) in predicting success or failure pending trial (Table 2). Fisher's exact test, a statistical test used with categorical data, was used to test whether any observed differences are statistically significant. A risk factor identified as statistically significant means that the differences observed between success and failure outcomes are not due to chance. A p-value of  $p \leq .05$  means that fewer than 5 in 100 samples would present a difference when there is none in actuality.

Two risk items - *Current Charge Type* and *Two or More Failures to Appear* - are not found to be statistically significant, meaning that the differences observed between success or failure in the presence of these risk items are not reliable and could be due to chance. Additionally, it was made apparent through the data collection process and total counts that outstanding warrants from other jurisdictions was not captured by staff due to a lack of access to a database with this information. The presence of the remaining five risk items result in pretrial failure at a higher rate. Additionally, the observed differences between failure and success are found to be statistically significant, supporting their use as pretrial failure predictors. For example, 437 defendants reported living at their current residence less than one year and of these, 169 reflected failure during their pretrial period, a failure rate of 38.7%. 1,164 defendants reported living at their current residence more than one year and of these, 340 reflected failure during their pretrial period, a failure rate of 29.2%. Defendants with this risk factor fail at higher rates than those without it, and the differences between the risk factor and any failure were found to not be due to chance according to statistical thresholds ( $p \leq .05$ ).

Table 2. Risk Items and Any Failure Outcome for the Eight EPPRA Risk Factors

		Total		Any Failure		Failure Rate
		N	%	N	%	%
Lived at Residence Less Than One Year*	Yes	437	27%	169	33%	39%
	No	1164	73%	340	67%	29%
Charge Type	Felony/Violent	653	41%	225	44%	34%
	Misdemeanor	948	59%	284	56%	30%
Under Supervision*	Yes	156	10%	72	14%	46%
	No	1445	90%	437	86%	30%
Two or More Failures to Appear	Yes	26	2%	13	3%	50%
	No	1575	98%	496	97%	31%
Two or More Violent Convictions*	Yes	89	6%	41	8%	43%
	No	1512	94%	468	92%	31%
Pending Charges*	Yes	302	19%	132	26%	44%
	No	1299	81%	377	74%	29%
Warrant From Other Jurisdictions	Yes	0	0%	0	0%	n/a
	No	1601	100%	509	100%	32%
Not continuously employed 6 months or primary caregiver for two years*	Yes	852	53%	300	59%	35%
	No	749	47%	209	41%	28%

\*Observed differences between risk factor and Any Failure are statistically significant; Fisher's exact test  $p \leq .05$

Although not all the current EPPRA risk factors individually relate to pretrial failure, multivariate analysis was conducted to determine whether the risk factors currently being used as a group by the El Paso County are valid predictors. As seen in Table 3, logistic regression analysis provides support for EPPRA as a whole being statistically significant in predicting Any Failure ( $p \leq .05$ ). Five of the seven risk factors are statistically significant. *Charge Type* and *Having Two or More Previous Failure to Appear* are not significant predictors of pretrial failure at the  $p \leq .05$  level. Analysis was expanded to determine whether the current EPPRA can be used as a predictor for individual pretrial failure outcomes. EPPRA as a whole is statistically significant in predicting pretrial failure (Any Failure), FTAs<sup>1</sup>, and any New Arrest ( $p \leq .05$ ), but not in predicting failure to comply (FTC) with release conditions. Additionally, not all risk items are significant predictors of each pretrial outcome, which suggests possible improvement to the assessment tool; a revised EPPRA is explored in Research Objective 2.

The predictive accuracy of the models is assessed using Area Under the Curve (AUC) Receiver Operator Characteristics (ROC) estimates. AUC-ROC is a common measure of risk assessment instrument performance. It provides a meaningful value reflecting the likelihood that when randomly selecting a case that had one of the outcomes, that case would have a higher score on the risk assessment than a randomly selected case that did not have the outcome (Singh and Falzer, 2010; Swets 1988). AUC-ROC values range from 0 to 1.0 with values greater than 0.5 suggesting predictions better than random

<sup>1</sup> FTA is defined as a warrant issued for failing to appear to a scheduled pretrial court hearing.

chance; AUC-ROC values of .54 and below are considered poor, .55 to .63 are fair, .64 to .70 are considered good, and .71 to 1.00 are considered excellent (Desmarais, S. L., & Singh, J. P., 2013). The Any Failure AUC-ROC value of .627 indicates the probability that taking into account the seven EPPRA risk factors together, a randomly selected defendant who has any pretrial failure will have more of the risk factor characteristics than a randomly selected successful defendant. This value of .627 reaches the upper bound of what is considered fair, although it is lower than Virginia's' Any Failure ROC score (Danner, VanNostrand, and Spruance, 2016) or PCRA's' (Post Conviction Risk Assessment) (Skeem and Lowenkamp, 2016).

Table 3. Logistic Regression - Predicting Failure Outcomes with EPPRA Risk Factors

	Any Failure		FTA Failure		New Arrest		Failure to Comply	
	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P
Lived at Residence Less Than One Year	1.511	.001	2.024	.000	1.357	.023	1.083	.739
Charge Type	1.147	.221	0.954	.780	1.370	.011	0.995	.982
Under Supervision	1.672	.006	1.370	.242	1.485	.050	0.805	.534
Two or More Failures to Appear	1.931	.113	1.024	.970	2.360	.039	1.211	.829
Two or More Violent Convictions	1.698	.022	1.146	.698	1.679	.032	1.151	.718
Pending Charges	1.693	.000	1.251	.296	1.848	.000	1.587	.091
Warrant From Other Jurisdictions	n/a	n/a	n/a		n/a		n/a	
Unstable Employment	1.330	.010	1.254	.178	1.195	.152	1.028	.897
Constant	0.272	.000	0.077	.000	0.162	.000	0.348	.000
Model (Wald) Chi-Square	60.09	p=.000	27.49	p=.000	58.530	p=.000	3.280	p=.858
McFadden (Pseudo) R Square	0.032		0.022		0.032		0.006	
AUC-ROC	0.627		0.621		0.629		0.558	
AUC-ROC 95% Confidence Intervals	Lower=	Upper=	Lower=	Upper=	Lower=	Upper=	Lower=	Upper=
	0.598	0.655	0.575	0.661	0.596	0.661	0.498	0.618

Note: Robust estimates of variance are employed. FTC Failure is restricted to only defendants placed on pretrial supervision (n=443); all other outcomes are restricted to only defendants who were released (n=1,601).

The original EPPRA classifies defendants under one of five risk levels of pretrial failure based on the combined score of the risk factors. Although two of these items have been found to not significantly predict pretrial failure, we assessed how the current risk levels reflect the likelihood of any pretrial failure. This allows us to evaluate how the current tool functions with the risk items and risk levels in place.

Table 4 summarizes the effectiveness of the original EPPRA, including overall predictive ability of the instrument (AUC-ROC), distribution of the released defendants into risk levels, and failure rates associated with risk levels. The differences in failure rates observed across the risk levels are statistically significant and not due to chance (Fisher's Exact  $p \leq .05$ ), and the results of the Pearson correlation indicated there is a significant positive association between the risk levels and any failure ( $r = .174$ ,  $p \leq .05$ ). The AUC-ROC of the EPPRA risk levels is 0.602, a lower value than the predictive ability of the combined EPPRA values reported in Table 2, yet consistent in remaining in the fair range of predictive ability. The *Total %* column shows that nearly half of all defendants booked (44.7%) are classified as low risk, and of those low risk released (94%), close to a quarter reflect some form of pretrial failure (23.8%). Further investigation is required to assess if a lower risk level can be identified, breaking the large proportion of defendants currently categorized as low risk with a failure rate of close to 25%.

Table 4. Any Failure Outcome by EPPRA Risk Level

Risk Level	Total RA - Booked			Total RA - Released			Any Failure	
	Score	N	Total %	N	Proportion	Total %	N	Rate
Low	0 to 1	823	44.7%	777	.94	48.5%	185	23.8
Below Average	2	619	33.6%	530	.86	33.1%	192	36.2
Average	3	296	16.1%	219	.74	13.7%	97	44.3
Above Average	4	87	4.7%	65	.75	4.1%	29	44.6
High	5 to 8	17	1.0%	10	.59	0.6%	6	60.0
		1842		1601			509	
Base Rate							31.79	
Pearson Chi-Square							52.02, $p = .000$	
Fisher's Exact							$p = .000$	
AUC-ROC							0.602	
AUC-ROC 95% Confidence Intervals							Lower= 0.574 Upper= 0.630	
DIFR							0.39	
Pearson's r							0.174	

If risk level recommendations or matching criteria are being used by staff to guide release or detention decisions, you can expect to see a greater proportion of low risk defendants released than those at higher risk levels. As seen in Table 3, this pattern is observed except for Average and Above Average Risk defendants, which had a similar proportion of defendants released, .74 and .75, respectively. Properly specified risk levels will reflect increased failure rate with increased risk levels. This is observed overall, from an Any Failure rate at the Low Risk level of 23.8 increasing to a 60.0 Any Failure rate at High Risk level. Average and Above Average risk levels though are found to have similar Any Failure rates. The similar release rates and failure rates for Average and Above Average risk levels indicates that these two EPPRA risk categories are not substantially different from one another, both in practical use by county magistrates in release decisions and in failure rates of defendants released. This finding supports further analysis to revise EPPRA and the risk levels categories.

## Research Objective Two: Create a revised EPPRA utilizing valid risk items identified and revised risk categories with risk profiles.

### Test of the statistical validity of new risk factors and excluding non-predictive risk items

Having determined that the EPPRA statistically predicted overall failure rates, analysis proceeded with revising the EPPRA to include only significant risk items that contribute to increased pretrial failure prediction.

As seen in Table 3, the items of *Current Felony/Violent Misdemeanor Charge*, *Two or More Prior FTAs*, and *Outstanding Warrants in Other Jurisdictions* did not statistically contribute to the overall predictability of the EPPRA. At the time of assessment, risk assessors had no access to any criminal history outside of local Odyssey records; as such, there was not a single score of 1 regarding *Outstanding Warrants in Other Jurisdictions* in our sample. Although we are unable to measure its predictability, current risk assessors now have access to both national and state crime information centers (NCIC/TCIC). This question will be measured as a field test item, but will not contribute to a risk score.

*Current Felony/Violent Misdemeanor Charge* is left out of the revised EPPRA for several reasons. Statistically, it is not a significant predictor of any measure of pretrial success, including overall failure, FTA, New Non-Violent Arrest, New Violent Arrest, or Any New Arrest. In terms of risk assessment score fidelity, it is the only item that can change after the risk assessment is conducted. For example, a defendant can be initially charged with a felony, thereby earning the defendant a point on the risk assessment. However, after that initial assessment, the charge can be dropped to a misdemeanor, thus changing his risk score without any action on the defendant's part. No other risk item can fluctuate pre-magistration, and removing the *Current Charge* item will allow the assessment to remain constant throughout the pretrial process. Finally, the severity of the current charge is one axis of the existing pretrial decision framework; including the Current Charge item in the EPPRA will result in double counting: once in the risk assessment and again in determining release recommendations.

*Two or More Prior FTAs* is excluded from the revised EPPRA as a predictor for Any Failure, FTA, New Non-Violent Arrest, and New Violent Arrest as statistical significance was not found at the  $p \leq .05$  level. It was found to be a significant predictor for Any New Arrest. For this purpose it remains as an item in the risk assessment questionnaire but used only for calculating a risk score for Any New Arrest failure.

There are two categories of new items that can be introduced into a revised EPPRA: items based on demographic information that was collected at the time of assessment but not used in the tabulation of a risk score, and potential future items that, while we have no local data on them now, other research has found to be predictive of pretrial failure rates on other populations. This latter category will be developed by gradually introducing field test items into the risk assessment; these items will be measured to determine their significance (if any) in predicting pretrial failure, but will not contribute to the current risk score, and will not be incorporated into the risk profile that will be visible to judges or attorneys. While it is unnecessary to codify a rigid set of rules and procedures for when to introduce and

remove field test items, practical care should be taken to not introduce many new items at once at the risk of making the EPPRA interview too onerous, as well as in the interest of maintaining expediency during the entire booking process.

Research has identified defendants' age as a predictor of pretrial outcomes (Bechtel and Lowenkamp, 2011). Since both date of birth and date of booking were recorded on each risk assessment, the defendant's age at the time of booking was calculated under a new variable with the potential domain of  $(0, \infty)$ , but given the dataset, the domain became restricted to more reasonable  $[17, 82.3]$ . A binary variable was then introduced as a scoring variable, with a score of 1 being assigned to any age less than a given threshold. Various thresholds were tested at increments of .5 years beginning with 17.5 years of age and ending with 22.

Danner, et al. (2016) state that the Chi-Square test and Cramer's  $V$  statistic should guide the selection process for new variables. Chi-square identifies if there is a significant relationship between variables and Cramer's  $V$  is used to determine the strength of association (Acock and Stavig, 1979).

Table 5. Descriptive and Bivariate Statistics for Different Thresholds of Age at Time of Booking (Any Failure Outcome)

Age at Time of Booking	Total		Any Failure		Chi-Square	P	Cramer's $V$
<i>Score 1 point if age is:</i>	N	%	N	%			
$\leq 17.5$	25	1.36	10	40	1.7691	0.183	0.0310
$\leq 18.0$	52	2.82	19	36.54	1.8754	0.171	0.0319
$\leq 18.5$	90	4.89	34	37.78	4.3649	0.037	0.0487
$\leq 19.0$	127	6.89	44	34.65	2.8723	0.090	0.0395
$\leq 19.5$	187	10.15	65	34.76	4.5367	0.033	0.0496
$\leq 20.0$	239	12.98	75	31.38	1.4432	0.230	0.0280
$\leq 20.5$	285	15.47	91	31.93	2.4191	0.120	0.0362
$\leq 21.0$	338	18.35	107	31.66	2.5595	0.110	0.0373
$\leq 21.5$	392	21.28	120	30.61	1.5282	0.216	0.0288
$\leq 22.0$	456	24.76	136	29.82	0.8695	0.351	0.0217

Based on the results of Table 5, the only two thresholds whose Chi-Squared P-value is less than 0.05 are  $\leq 18.5$  and  $\leq 19.5$ . Their Cramer's  $V$  statistics are also substantially higher than any other threshold's, making them prime candidates for inclusion into the updated EPPRA model (Danner, et al., 2016).

Each of these thresholds were also tested for statistical significance within the updated EPPRA model that discarded *Current Felony/Violent Misdemeanor Charge* and *Outstanding Warrants in Other Jurisdictions*.  $\leq 18.5$  and  $\leq 19.0$  is significant at  $\alpha=0.05$ , while  $\leq 19.5$  is not. Since  $\leq 18.5$  was the only threshold that had a significantly high Chi-Square, a high Cramer's  $V$ , and was statistically significant within the updated EPPRA model,  $\leq 18.5$  is the binary scoring threshold for the new *Age at Time of Booking* item.

In order to conclude that the addition of this new risk item made the risk assessment a better model for predicting overall failure—or at the very least, did not make the overall assessment statistically worse—the area under the receiver operating characteristic curve (AUC ROC) was measured for both the new EPPRA model with and without *Age at Time of Booking*. Researchers recommend the use of AUC scores as a measure of predictive accuracy instead of only comparing Wald Chi-Squares or Pseudo R-Squares

(Swets, Dawes, and Monahan, 2000; Rice and Harris, 2005; Picard-Fritsche et.al., 2017). The null hypothesis of the AUC ROC comparison test is that the area under the ROC for predictors from the model with *Age at Time of Booking* is the same as the area under the ROC for predictors from the model without. Therefore, a Chi-Square with a P-Value  $\leq 0.05$  signifies that the two models are statistically significantly different from each other.

Table 6. Comparing the AUC ROC between the model that includes Age at Time of Booking vs the model that does not (Any Failure Outcome)

<i>New EPPRA model:</i>	AUC ROC	Std. Error
With <i>Age at Time of Booking</i>	0.629	0.015
Without <i>Age at Time of Booking</i>	0.626	0.015
Chi-Square	0.51	
P-Value	0.4744	

Table 6 shows that the model with and without Age at Time of Booking is not statistically significantly different in predicting overall failure ( $p=0.47$ ). This supports that adding Age at Time of Booking as a risk item in the revised EPPRA does not negatively impact its ability to predict overall failure. In addition:

- 1) The inclusion of this item can be calculated with no intervention required as the factors of this calculation are already mandatory on every risk assessment. In other words, since the interviewer must already include the defendant's date of birth and the date of booking, it requires no additional effort on the interviewer's part, and thus it does impact the booking process.
- 2) This variable meets the criteria of a more stable risk item as it cannot change post-magistration, a benefit over *Current Felony/Violent Misdemeanor*.
- 3) Logistic regression (Table 7) identifies this risk item as a significant individual predictor of pretrial failure.

Table 7 shows each of the remaining variables in the model, as well as the additional variable of *Age at Time of Booking*, and the significance (or lack thereof) of their contribution to determining each of the six measured outcomes. Only *Two or More Prior FTAs* does not significantly contribute to predicting overall failure, however, it does significantly contribute to predicting Any New Arrest, supporting its inclusion in the revised EPPRA. *Length of Time at Current Address* is the only significant predictor for FTA failure. No variables significantly predict FTC failure, nor does the risk assessment as a whole. This could be due to the fact that this is the only outcome that requires a further restriction on the sample size to include only those defendants who were released on pretrial supervision. This restriction must occur because anyone who is not on pretrial supervision would automatically succeed at FTC (because it is impossible to fail to comply with conditions that a defendant does not have), thereby inflating the rate of success by approximately 400%. Predicting New Violent Arrest could be given as an interview-less assessment as all three of its significant items can be gathered directly from Odyssey without asking the defendant any questions.

Table 8 shows the predictive values of only those variables that were found to be statistically significant in Table 7. Eliminating non-significant variables does not render any of the remaining variables insignificant, and each outcome's model remains statistically predictive.



Table 7. Predicting various Failure Outcomes using ALL revised EPPRA Risk Factors

	Any Failure		FTA Failure		FTC Failure		Non-Violent Arrest		Violent Arrest		Any New Arrest	
	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P
Length of Time at Current Address	1.521	0.001	2.023	0.000	1.075	0.761	1.391	0.017	1.068	0.797	1.370	0.019
Currently Under Supervision	1.723	0.006	1.395	0.218	0.818	0.566	1.472	0.061	2.282	0.014	1.527	0.037
Prior FTAs $\geq 2$	2.004	0.103	1.039	0.952	1.232	0.814	2.003	0.090	2.110	0.268	2.473	0.026
Prior Violent Convictions $\geq 2$	1.795	0.016	1.159	0.676	1.176	0.679	1.655	0.041	2.482	0.019	1.825	0.013
Current Pending Charge	1.742	0.000	1.267	0.270	1.628	0.075	1.791	0.000	1.299	0.389	1.912	0.000
Employment History	1.319	0.009	1.242	0.199	1.019	0.931	1.186	0.185	1.084	0.727	1.187	0.169
Age at Time of Booking	1.835	0.000	1.468	0.271	1.362	0.430	1.760	0.031	2.469	0.030	1.785	0.022
Wald Chi-Square	64.67	0.000	29.88	0.000	3.86	0.7955	50.35	0.000	26.56	0.000	55.94	0.000
Pseudo R-Square	0.034		0.023		0.007		0.030		0.030		0.031	
AUC ROC	0.629		0.631		0.562		0.618		0.658		0.625	
Classification	Fair		Fair		Fair		Fair		Good		Fair	

Note: *FTC Failure* is restricted to only defendants placed on pretrial supervision ( $n=443$ ); all other outcomes are restricted to only defendants who were released ( $n=1,601$ ).

Table 8. Predicting various Failure Outcomes using ONLY SIGNIFICANT revised EPPRA Risk Factors

	Any Failure		FTA Failure		FTC Failure		Non-Violent Arrest		Violent Arrest		Any New Arrest	
	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P	Odds Ratio	P
Length of Time at Current Address	1.524	0.001	2.052	0.000	--	--	1.410	0.012	--	--	1.393	0.013
Currently Under Supervision	1.760	0.002	--	--	--	--	--	--	2.544	0.002	1.538	0.033
Prior FTAs $\geq 2$	--	--	--	--	--	--	--	--	--	--	2.437	0.026
Prior Violent Convictions $\geq 2$	1.812	0.010	--	--	--	--	1.710	0.029	2.627	0.009	1.838	0.012
Current Pending Charge	1.740	0.000	--	--	--	--	2.112	0.000	--	--	1.924	0.000
Employment History	1.313	0.014	--	--	--	--	--	--	--	--	--	--
Age at Time of Booking	1.816	.011	--	--	--	--	1.703	0.041	2.389	0.038	1.814	0.019
Wald Chi-Square	61.56	0.000	18.41	0.000	--	--	39.84	0.000	21.13	0.000	53.96	0.000
Pseudo R-Square	0.0324		0.0163		--		0.0243		0.0267		0.0302	
AUC ROC	0.6278		0.5790		--		0.5963		0.6097		0.6179	
Classification	Fair		Fair		--		Fair		Good		Fair	

Note: *FTC Failure* is restricted to only defendants placed on pretrial supervision ( $n=443$ ); all other outcomes are restricted to only defendants who were released ( $n=1,601$ ).

## Development of Revised Risk Categories

### Analysis on risk categorization for the pretrial outcome of Any Failure

With the range of possible scores decreasing from [0, 8] to [0, 6], it is critical to see how the distribution of scores changes, especially with respect to the categorical Any Failure rate. The current EPPRA risk categorization, as can be seen in Table 4 above, is heavily skewed to the lower risk category, rendering a non-normal distribution. Risk categorization must take into account both the distribution of the population, the failure rates of each category in relation to its nearest neighbor and whether there is significance between categories, the AUC ROC of the risk categorization in comparison to the uncategorized model, and how well dispersed the categorizations are.

The latter of these can be measured using the Dispersion Index for Risk developed by Silver and Banks (1999), which “allows for calibration of predictive power across different risk classification models, enabling discrimination among them, without requiring their reduction to a binary prediction table... and without requiring that they consist of equal numbers of subgroups” (p. 17). The formula for DIFR is as follows:

$$DIFR = \sqrt{\sum_{i=1}^k \left[ \left( \ln \left( \frac{P}{1-P} \right) - \ln \left( \frac{p_i}{1-p_i} \right) \right)^2 * \frac{n_i}{N} \right]}$$

“where  $k$  is the number of subgroups in the risk classification model,  $P$  is the total sample base rate of the outcome of interest,  $N$  is the total sample size,  $p_i$  represents the base rates of each of the  $k$  subgroups, and  $n_i$  represents the sizes of each of the  $k$  subgroups” (Silver & Banks, 1999, p. 16). The DIFR of the original EPPRA risk categorization is 0.38759; improved risk categories will reflect a higher DIFR value.

Table 9 shows that there is at least one logical group in risk scores 4 and 5. This would retain a 5 level risk category model, and its distribution can be seen in Table 10. Table 11, however, shows that there is no statistical significance between levels 3 and 4, nor between 4 and 5. An examination of Table 10 shows that there are only 20 defendants in level 5, with 11 defendants reflecting Any Failure and 9 without failure. This almost even split with a low sample size makes the failure rate highly volatile if there is any change in the counts. In other words, adding as few as 5 more defendants to category 5 would yield a possible range of failure rates from 44% to 64%.

Table 9. Any Failure Outcome by revised EPPRA Risk Score

Score	Total <i>N</i>	Total %	Any Failure <i>N</i>	Any Failure %
0	399	24.92	78	19.55
1	653	40.79	197	30.17
2	408	25.48	165	40.44
3	121	7.56	58	47.93
4	16	1	9	56.25
5	4	0.25	2	50.00
6	0	0.00	0	0.00
	1,601		509	31.79

Note: Fisher's exact P-Value: 0.000; AUC ROC: 0.6112; DIFR: 0.436956.

Table 10. Any Failure Outcome by EPPRA Risk Level with 5 categories

Risk Level	Score	Total <i>N</i>	Total %	Any Failure <i>N</i>	Any Failure %
1	(0)	399	24.92	78	19.55
2	(1)	653	40.79	197	30.17
3	(2)	408	25.48	165	40.44
4	(3)	121	7.56	58	47.93
5	(4-6)	20	1.25	11	55.00
Total		1,601		509	31.79

Note: Fisher's exact P-Value: 0.000; AUC ROC: 0.6151; DIFR: 0.436801

Table 11. Comparing the significance between risk categories with the 5 category model (Any Failure Outcome)

Risk Level Comparison	Chi-Squared	<i>P</i> > Chi-Squared
From 1 to 2	14.26	0.0002
From 2 to 3	11.71	0.0006
From 3 to 4	2.14	0.1436
From 4 to 5	0.34	0.5591

Table 12 shows the distribution of a 4 category risk model. The number of defendants in category 4 are now 141, and an increase of 5 defendants would change the range of failure rate from [47.26%, 50.68%], thereby not substantially changing the marginal rate from level 3 to level 4, and making the highest risk group much less volatile. However, Table 13 shows that while there is now a greater difference from level 3 to 4, it is still not significant at  $\alpha=0.05$ .

Table 12. Any Failure Outcome by revised EPPRA Risk Level with 4 categories

Risk Level	Score	Total <i>N</i>	Total %	Any Failure <i>N</i>	Any Failure %
1	(0)	399	24.92	78	19.55
2	(1)	653	40.79	197	30.17
3	(2)	408	25.48	165	40.44
4	(3-6)	141	8.81	69	48.94
Total		1,601		509	31.79

Note: Fisher's exact P-Value: 0.000; AUC ROC: 0.6149; DIFR: 0.435806

Table 13. Comparing the significance between risk categories with the 4 category model (Any Failure Outcome)

Risk Level Comparison	Chi-Squared	$P > \text{Chi-Squared}$
From 1 to 2	14.26	0.0002
From 2 to 3	11.71	0.0006
From 3 to 4	3.08	0.0794

Combining risk levels 3 and 4 into a single level in a 3 category model does yield a Chi-Squared of 19.95 between levels 2 and 3, with a  $P$ -value of 0.0000. That model also yields a Fisher's exact  $P$ -value of 0.000, an AUC ROC of 0.6105, which is not significantly lower than the uncategorized model, and a DIFR of 0.427233, substantially higher than the current EPPRA risk categorization. In a purely statistical sense, the model with 3 categories is the most logical choice, however, practical consideration within the context of magistration, pretrial services, and defendants' rights must be considered.

In the context of pretrial services, it is easier to target services to a specific risk level as the size of that level decreases. Combining 4 different risk scores into a single category significantly muddles Above Average risk defendants into a group with no discernable differences, and makes individualized services more difficult to achieve. Of course, a 5 category risk model would decrease above average risk category sizes even further, but in terms of magistration, 5 categories muddles the actual differences in risk between defendants in adjacent risk categories above level 2. In order to build trust in risk categorization, there must be a clear and substantial difference between risk levels in order to provide clear guidance to magistrate judges. Finally, it must be remembered that all defendants are presumed innocent until proven guilty. It is easy to argue that it is not fair to a defendant with a risk score of 2 and a corresponding failure rate of 40% to be lumped into the highest risk category level with defendants who score 5 points, and to be assumed to exhibit all of the negative characteristics that are implied with belonging to the highest risk category. This argument is much harder to make for defendants with a risk score of 3 since their corresponding failure rate is only 2 percentage points lower than defendants who scored 5 points. Therefore, in order to best balance all of the above factors, the revised EPPRA-R features four risk categories for overall failure, labeled as Risk Level Categories 1-4.

#### Analysis on risk categorization for the pretrial outcome of Failure to Appear

Determining risk levels for failure to appear, on the other hand, is a very simple and rigid process as there are only two possible scores in this single item model. Table 14 shows the distribution of these risk levels, while Table 15 shows the Chi-Squared differences between the risk levels. The difference between levels 1 and 2 are significant, Fisher's exact is significant at  $\alpha=0.05$ , and the AUC ROC is, by definition, the exact same as the model overall. The DIFR score has been suppressed since there is neither a current categorization for FTA, nor a possible potential other model to compare it to.

Table 14. FTA Failure Outcome by revised EPPRA Risk Level with 2 categories

Risk Level	Score	Total N	Total %	FTA Failure N	FTA Failure %
1	(0)	1,164	72.70	99	8.51
2	(1)	437	27.30	70	16.02
Total		1,601		169	10.56

Note: Fisher's exact P-Value: 0.000; AUC ROC: 0.5790

Table 15. Comparing the significance between risk categories with the 2 category model (FTA Failure Outcome)

Risk Level Comparison	Chi-Squared	<i>P</i> > Chi-Squared
From 1 to 2	14.26	0.0002

### Analysis on risk categorization for the pretrial outcome of New Non-Violent Arrest

Table 16 shows the distribution of scores for the outcome of New Non-Violent Arrest. This 4 category model suffers from the same problem as the 5 category Any Failure outcome model in that the last category features a very small proportion of defendants, which introduces significant volatility. However, risk scores 2 and 3 are not combined because: a) the addition of 5 more defendants in risk level 4 changes the range from [43.75%, 75%], the lower bound of which is still more than 10% higher than risk level 3, and b) Table 17 shows that the *P*-Value of the Chi-Squared from level 3 to 4 is 0.0534, and the precedent of allowing risk levels with a *P*-Value of 0.0794 has already been established with the Any Failure outcome. Furthermore, the 4 category model's DIFR is 0.353281, while the 3 category model's DIFR is 0.340139, and its AUC ROC of 0.5882 is not statistically significantly different than the 4 category model. In the pretrial context, the difference in failure rates between levels 3 and 4 is not muddled for magistrate judges, pretrial services can effectively target the highest risk defendants, and no defendants can feel miscategorized since the risk levels correspond to risk scores 1:1.

Table 16. New Non-Violent Arrest Outcome by revised EPPRA Risk Level with 4 categories

Risk Level	Score	Total N	Total %	Non-Violent N	Non-Violent %
1	(0)	842	52.59	130	15.44
2	(1)	621	38.79	141	22.71
3	(2)	127	7.93	42	33.07
4	(3-4)	11	0.69	7	63.64
Total		1,601		320	19.99

Note: Fisher's exact P-Value: 0.000; AUC ROC: 0.5887; DIFR: 0.353281. No defendant scored 4 points.

Table 17. Comparing the significance between risk categories with the 4 category model (New Non-Violent Arrest Outcome)

Risk Level Comparison	Chi-Squared	<i>P</i> > Chi-Squared
From 1 to 2	12.37	0.0004
From 2 to 3	6.04	0.0140
From 3 to 4	3.73	0.0534

### Analysis on risk categorization for the pretrial outcome of New Violent Arrest

Table 18 shows the distribution of scores for the New Violent Arrest outcome. The Chi-Squared *P*-Value between score 1 and 2 is 0.7567, which strongly suggests that there is no significant difference between these two scores. In terms of magistration, the difference in risk levels in a 3 category model would not only significantly muddle the difference between categorical violent arrest rates of those scoring 1 and 2 points, but is also illogical. Table 19 shows the distribution of a 2 category model, and Table 20 shows that the Chi-Squared *P*-Value between both risk levels is significant at  $\alpha=0.05$ . The AUC ROC of the 2 category model is actually higher than that of the model as a whole, although not significantly so, while the DIFR rounds to the same score for both models at the thousandths. The New Violent Arrest outcome therefore contains two risk levels.

Table 18. New Violent Arrest Outcome by revised EPPRA Risk Score

Score	Total <i>N</i>	Total %	Violent <i>N</i>	Violent %
0	1,289	80.51	48	3.72
1	299	18.68	31	10.37
2	13	0.81	1	7.69
	1,601		80	5.00

Note: Fisher's exact *P*-Value: 0.000; AUC ROC: 0.6075; DIFR: 0.440207

Table 19. New Violent Arrest Outcome by revised EPPRA Risk Level with 2 categories

Risk Level	Score	Total <i>N</i>	Total %	Violent <i>N</i>	Violent %
1	(0)	1,289	80.51	48	3.72
2	(1-2)	312	19.49	32	10.26
Total		1,601		80	5.00

Note: Fisher's exact *P*-Value: 0.000; AUC ROC: 0.6080; DIFR: 0.439808

Table 20. Comparing the significance between risk categories with the 2 category model (New Violent Arrest Outcome)

Risk Level Comparison	Chi-Squared	<i>P</i> > Chi-Squared
From 1 to 2	20.78	0.0000

### Analysis on risk categorization for the pretrial outcome of Any New Arrest

Table 21 shows the distribution of risk scores for the outcome of Any New Arrest. The lowest Chi-Squared between any two scores is 5.38 between 4 and 5 points. Even though this is significant with a *p*-value of 0.0204, adding 5 more defendants would increase the range from [16.67%, 100%], the lower bound of which is below that of all scores except 0. Combining 4 and 5 points into a single risk category generates a Chi-Squared of 18.31 between that category and 3 points, with a corresponding *P*-Value of 0.0001. Adding 5 more defendants increases the range from [36.36%, 81.82%], the lower bound of which would be only 4 points higher than the next smallest scoring category, but whose range would be over 45%. Combining 3-5 into a single category generates a Chi-Squared of 39.65 between that category and 2 points, with a corresponding *P*-Value of 0.0000 (Table 23). An increase of 5 defendants would only change the range to [39.47%, 52.63%], which has a spread of only 13%, and would be at worst 7 percentage points higher than a score of 2. Any New Arrest outcomes therefore contains 4 risk categories (Table 22).

Table 21. Any New Arrest Outcome by revised EPPRA Risk Score

Score	Total N	Total %	Any Arrest N	Any Arrest %
0	767	47.91	116	15.12
1	618	38.60	162	26.21
2	183	11.43	59	32.24
3	27	1.69	11	40.74
4	5	0.31	3	60.00
5	1	0.06	1	100.00
6	0	0.00	0	0.00
	1,601		352	21.99

Note: Fisher's exact P-Value: 0.000; AUC ROC: 0.6071; DIFR: undefined (cannot divide by zero)

Table 22. Any New Arrest Outcome by revised EPPRA Risk Level with 4 categories

Risk Level	Score	Total N	Total %	Any Failure N	Any Failure %
1	(0)	767	47.91	116	15.12
2	(1)	618	38.60	162	26.21
3	(2)	183	11.43	59	32.24
4	(3-6)	33	2.06	15	45.45
Total		1,601		352	21.99

Note: Fisher's exact P-Value: 0.000; AUC ROC: 0.6090; DIFR: 0.4208

Table 23. Comparing the significance between risk categories with the 4 category model (Any New Arrest Outcome)

Risk Level Comparison	Chi-Squared	<i>P</i> > Chi-Squared
From 1 to 2	25.69	0.000
From 2 to 3	38.00	0.000
From 3 to 4	39.65	0.000

### Rescoring Unreleased Defendants under EPPRA-R

Table 24 shows a comparison between how defendants were scored who were released on bond vs not released on bond, along with the corresponding Pearson Chi-Squared and Fisher's Exact test. With the exception of age at time of booking, every risk item shows a statistically significantly higher percentage of yes responses amongst those defendants who were not released on bond vs those who were. In terms of total points scored, non-released defendants are centered around 2 points instead of 1 point in the case of those who were released on bond. This is expected as those who were not released on bond would have higher proportions of yes responses, and thus a distribution of scores centered about a higher point value. This also translates into risk classification, as there are statistically significantly more defendants in Categories 3 and 4 who were not released as opposed to those who were, while the latter group has significantly more defendants in Categories 1 and 2 compared to the former group.

Age at time of booking is the only risk item that is not significantly different between those who were and those who were not released on bond. This is to be expected considering that age at time of

booking is the only item that was not reflected on the original EPPRA. While the defendant's date of birth is presented on the current risk assessment form, the defendant's age in relation to the critical point of 18.5 is not, and it is presumed not to have had a major influence in bonding decisions. This needs to be monitored once this risk item is implemented, however, to ensure that there is a statistical significance between those who are released and those who are not.

Table 24. Rescoring unreleased defendants using EPPRA-R (any failure outcome)

		Non-Released		Released		Chi-Sq.	P-value
		N	%	N	%		
<b>EPPRA-R Risk Items</b>							Fisher's
Lived at Residence	Yes	99	41.08	437	27.30	19.289	0.000
Less Than One Year	No	142	58.92	1,164	72.70		0.000
Under Supervision	Yes	54	22.41	156	9.74	33.252	0.000
	No	187	77.59	1,445	90.26		0.000
Two or More Violent	Yes	30	12.45	89	5.56	16.451	0.000
Convictions	No	211	87.55	1,512	94.44		0.000
Pending Charges	Yes	71	29.46	302	18.86	14.567	0.000
	No	170	70.54	1,299	81.14		0.000
Unstable	Yes	177	73.44	852	53.22	34.759	0.000
Employment	No	64	26.56	749	46.78		0.000
Age at Time of 18.5 and Under		10	4.15	80	5.00	0.3237	0.569
Booking	Over 18.5	231	95.85	1,521	95.00		0.748
<b>Total Points</b>							
	0	21	8.71	399	24.92	93.028	0.000
	1	68	28.22	653	40.79		0.000
	2	99	41.08	408	25.48		
	3	39	16.18	121	7.56		
	4	12	4.98	16	1.00		
	5	2	0.83	4	0.25		
<b>Risk Levels Category</b>							
	Level 1	21	8.71	399	24.92	85.673	0.000
	Level 2	68	28.22	653	40.79		0.000
	Level 3	99	41.08	408	25.48		
	Level 4	53	21.99	141	8.81		
<b>Total</b>		241	13.08	1,601	86.92		

Note: *Chi-Sq.* is the Pearson Chi-Squared coefficient, *P-Value* is its corresponding *P-Value*, and *Fisher's* is Fisher's Exact coefficient



## Failure Rates as a function of days in jail, bond type, and EPPRA-R Risk Levels

The following section considers additional factors that potentially influence pretrial failure, but occur after a risk assessment would be administered, and therefore cannot be reflected in the EPPRA-R. These factors include days spent in jail prior to release, type of bond release, and a defendant's risk level as a result of the EPPRA-R.

### Terms used in this section

Unless otherwise specified, the following terms are defined as follows:

- *Failure rate* is defined as the percentage of defendants who were issued a warrant for any of the following pretrial infractions: failure to appear to a scheduled court hearing, failure to comply with PR or Split bond conditions, being booked on a new non-violent charge, and being booked on a new violent charge. This is the contrapositive of Success Rate, which is the percentage of defendants who successfully completed their pretrial period by being issued no warrants.
- *Odds ratios* represent the odds that an outcome, such as pretrial failure, will occur given an independent variable, such as days spent in jail, compared to the odds of that outcome without the independent variable. An odds ratio greater than one means the variable in question is associated with higher odds of the outcome, a ratio smaller than one means the variable in question is associated with lower odds of the outcome, and a ratio of one indicates that the variable in question is associated with the exact same odds of the outcome as if the variable were not present, i.e. the variable has no effect on the outcome (Szumilas, 2010). All odds ratios in this section are calculated by running a logistic regression, and their statistical significance—or lack thereof—are documented below.
- *Days Spent in Jail* is a variable that measures how many days a defendant spends in jail before being released on bond. The discrete version of this variable is always rounded up to the next whole day, so spending 4 hours in jail corresponds to 1 day, while spending 73 hours in jail corresponds to 4 days. Under this definition, it is therefore impossible to spend less than one day in jail. A categorical version of this variable based on the discrete version is also used; the categorical thresholds are the same ones used by Fabelo in his 2018 El Paso County Recidivism study (Fabelo, Tyler, & Cohen, 2018). (*Note: Fabelo's categories are from  $n-1$  to  $m-1$  days, where  $n$  and  $m$  are integer categorical boundaries used in this study. For example, this study's 1-2 Days is equivalent to Fabelo's 0-1 Days, while 5-8 Days is equivalent to Fabelo's 4-7 Days, etc.*)
- *Bail*, as defined in Chapter 17 of the Texas Code of Criminal Procedure, "is the security given by the accused that he will appear and answer before the proper court the accusation brought against him, and includes a bail bond or a personal bond."
  - *Surety Bonds* are defined here as bail bonds that are specifically "entered into by the defendant and the defendant's sureties for the appearance of the principal therein before a court or magistrate to answer a criminal accusation." In other words, it is a bail bond that involves a surety.
  - *Cash Bonds* are defined here as bail bonds where the defendant posts "cash in lieu of having sureties sign the bond." In other words, it is a bail bond that does not involve a surety.

- *PR Bonds* are defined as a “personal bond without sureties or other security.” In other words, it is a personal bond that does not involve a surety, but does involve a “personal bond fee of \$20 or three percent of the amount of the bail fixed for the accused, whichever is greater. The court may waive the fee or assess a lesser fee if good cause is shown.” Furthermore, “the court may order that a personal bond fee... be: (1) paid before the defendant is released; (2) paid as a condition of bond; (3) paid as court costs; (4) reduced as otherwise provided for by statute; or (5) waived.” The magistrate may, and nearly always does, impose conditions and/or supervision that a defendant must follow; on charges involving “a controlled substance” or “drug or alcohol abuse,” conditions of alcohol or drug testing are mandatory.
- *Split Bonds* are defined here as a release with any combination of surety, cash, or PR bond. In other words, a defendant is said to be released on surety bond when that is the *only* type of bond required for release. This also holds true for PR and cash bonds. Therefore, if a defendant is released on more than one type of bond, that defendant is classified as having posted a split bond, even if the bond is not a split bond in the traditional sense of a simultaneous PR and cash/surety bond. In other words, a defendant can be initially released on surety alone, but then have PR conditions added later (a common occurrence in DWI cases in El Paso). Even though there was only one bond applicable at the time of release, since conditions were added during the pretrial phase, and since a failure to adhere to those conditions could lead to a pretrial warrant, and therefore a pretrial failure, these defendants are classified under split bonds. Formally, this convention forces the intersection of any two bond subsets to be the null set, which means that a defendant can be assigned to one and only one bond type, which prevents the total  $n$  of defendants released to exceed 1,601.

## Failure rates as a function of days spent in Jail

Figure 1. Distribution of days spent in jail

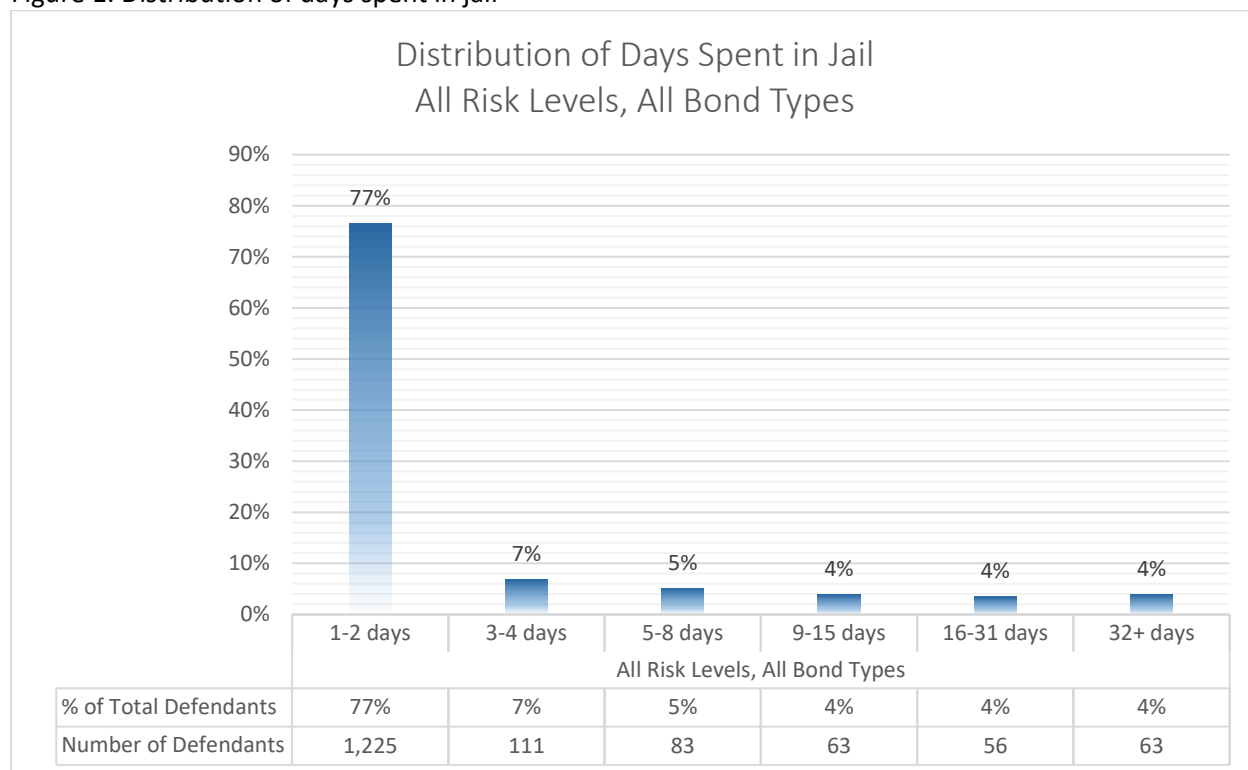


Figure 2. Failure rates and odds ratios of failing by days spent in jail

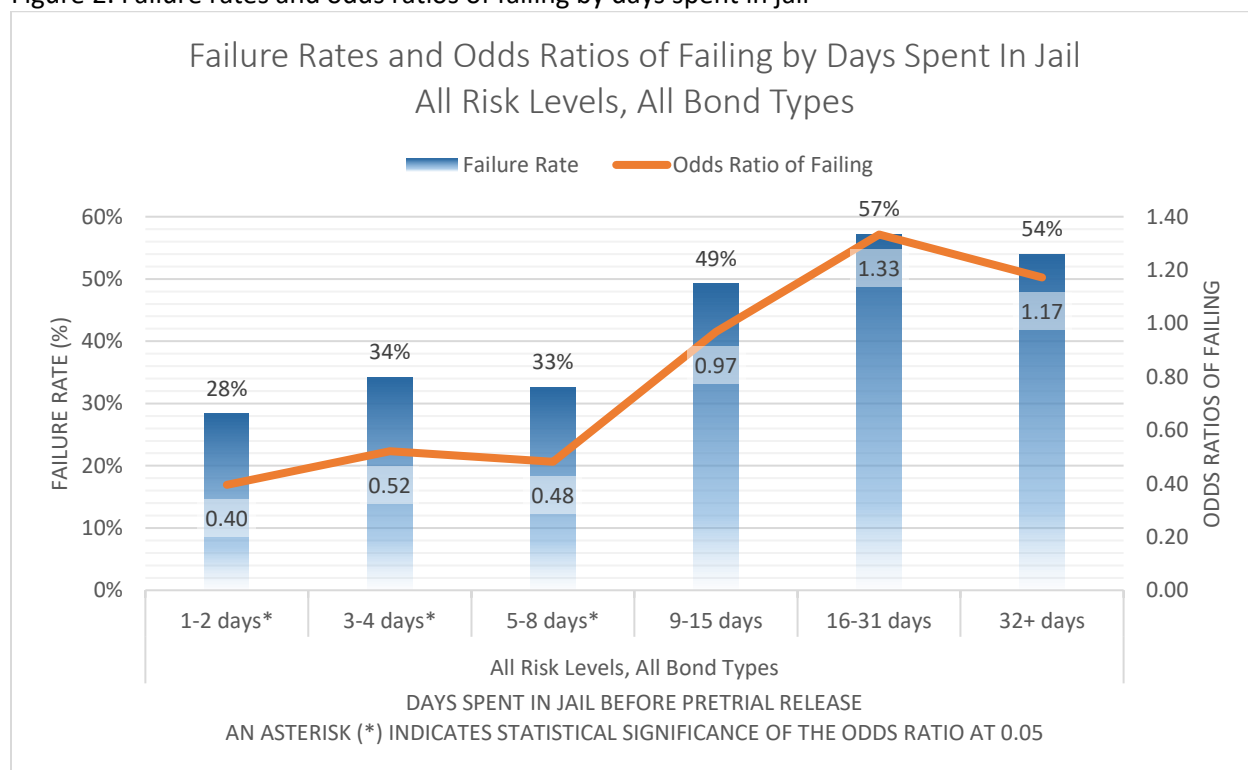


Figure 1 shows that over three quarters of all defendants are released within 1-2 days in El Paso County. The remaining defendants are relatively evenly distributed amongst the remaining five categories. The failure rates of all defendants released on bond is found on Figure 2. The largest change in failure rate between consecutive categories occurs between 5-8 days and 9-15 days, which represents a 16% increase in failure. This difference yields a chi-square of 4.11, with a corresponding  $P$ -value of 0.0426, which means that there is a significant difference in failure rate between 5-8 days and 9-15 days.

The odds ratios reflect this difference: defendants who were released within 1-2 days have odds of failing 0.40 times lower compared to those who were not released within 1-2 days. Converting this odds ratio to an easier to understand converse ratio yields  $1/0.40 = 2.5$ , which means that defendants released within 1-2 days are 2.5 times more likely to succeed (i.e. not incur any pretrial failures) than those who are not. Similarly, defendants released within 3-4 days are  $1/0.52 = 1.9$  times more likely to succeed, while defendants released within 5-8 days are  $1/0.48 = 2.1$  times more likely to succeed than those who are not. All three of these odds ratios are statistically significant at an  $\alpha=0.01$ . Conversely, defendants who were released within 16-31 days were 1.3 times more likely to fail than those who were not, while defendants released after 31 days were 1.2 times more likely to fail than those who were not. Defendants released within 9-15 days have a converse rate of  $1/0.97$ , which rounds to 1, indicating no difference in failure or success odds compared to those who were not released within 9-15 days. It is important to note, however, that no categories after 8 days were found to be statistically significant. This happens when the 95% confidence interval spans from an outcome being less likely to occur to more likely to occur, which means it is impossible to determine whether the variable contributes to succeeding or failing with the given data. For instance, defendants released within 16-31 days have a non-significant odds of being 1.3 times more likely to fail than those who are not. There is a 95% chance, however, that the real odds ratio is somewhere between  $1/0.79=1.3$  times more likely to *succeed* and 2.3 times more likely to *fail* than those who are not released within 16-31 days. Because of this large range, it is impossible to determine a reasonably accurate odds ratio at an  $\alpha=0.05$  (the  $p$ -value of this variable is 0.287). More data is required to either verify or refute the odds ratio of 16-31 days, as well as those of 9-15 and 32+ days. Furthermore, variables whose odds ratios are close to 1 will be very difficult to be bounded by a 95% confidence interval that does not span 1, which makes these variables very difficult to quantify with an  $\alpha=0.05$ . However, even though the odds ratio of 9-15 days is not significant, the difference between 9-15 days and 5-8 days *is* significant, which means a defendant who is held longer than 8 days *will* have higher odds of pretrial failure.

## Failure Rates as a Function of Risk Level and Days in Jail

Figure 3. Distribution of days spent in jail by EPPRA-R Risk Level

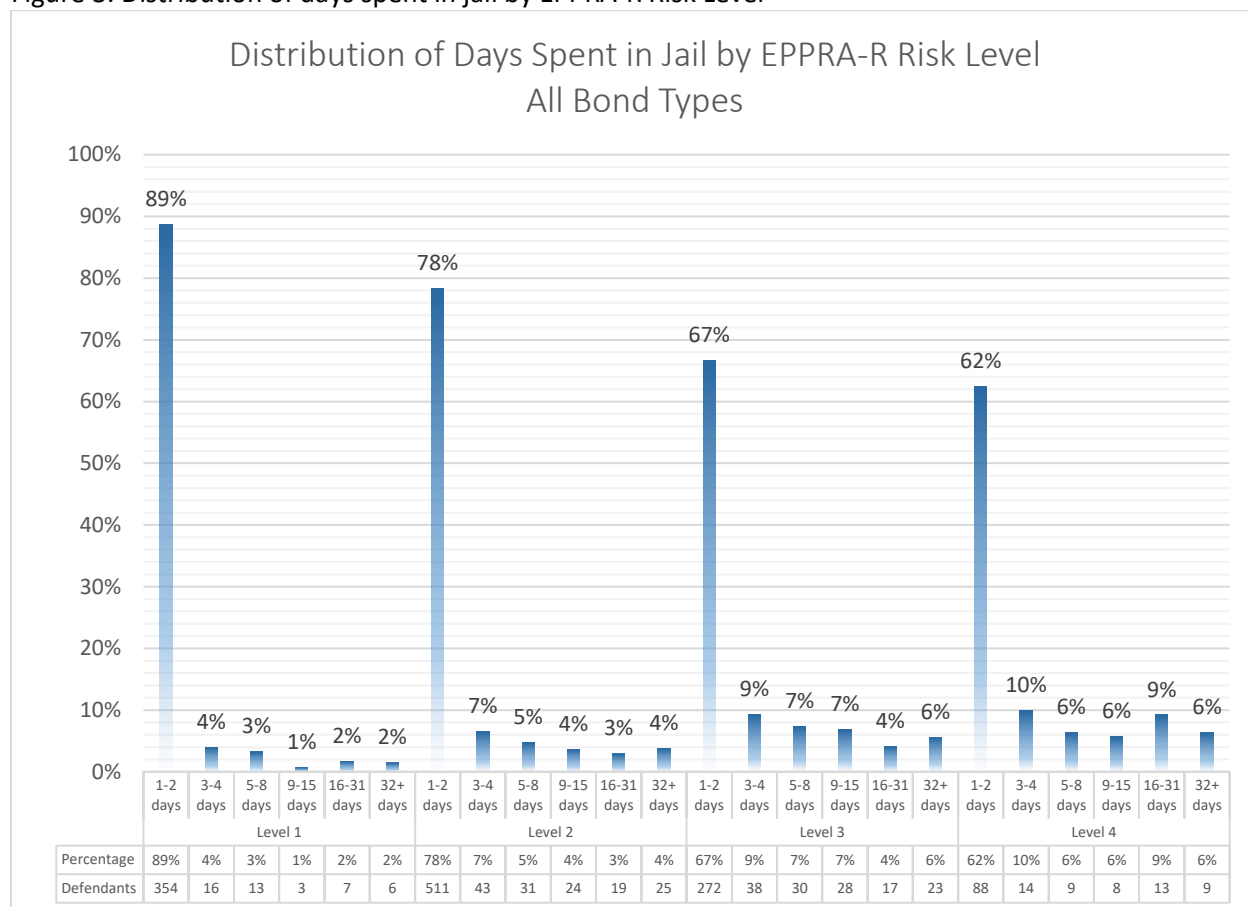


Figure 3 shows that the overall trend of most defendants being released within 1-2 days extends to each individual risk level. Even though Level 4 defendants do have the highest average days in jail, 62% of Level 4 defendants are still released within 1-2 days. Figure 4 shows the comparison between average days spent in jail between successful and non-successful defendants. Across all risk levels, defendants who fail pretrial spend a higher average number of days in jail versus those who do not. These differences are not statistically significant at an  $\alpha=0.05$  in Levels 2-4, which suggest that these differences could be due to random chance, and more data will need to be analyzed to verify these differences. However, days spent in jail *does* statistically predict pretrial failure within Level 1 at an  $\alpha=0.05$ . Figure 5 shows the failure rates of Level 1 defendants by days in jail categorically. At a statistical significance level of  $\alpha=0.05$ , Level 1 defendants released within 1-4 days are  $1/0.23 = 4.3$  times more likely to succeed than those who are not, while Level 1 defendants released within 5-8 days are  $1/0.08 = 12.5$  times more likely to succeed than those who are not. Although defendants released within 9-15 days are  $1/0.50 =$  twice as likely to succeed as those who are not, its 95% confidence interval suggests that these defendants could be as high as 5.5 times more likely to *fail* than those who are not released within 9-15 days, and as such this odds ratio is not statistically significant at  $\alpha=0.05$ ; the same is true for the remaining two categories. More data is needed in order to verify—or refute—those odds ratios.

Figure 4. Average days spent in jail for successful vs non-successful defendants by EPPRA-R Risk Level

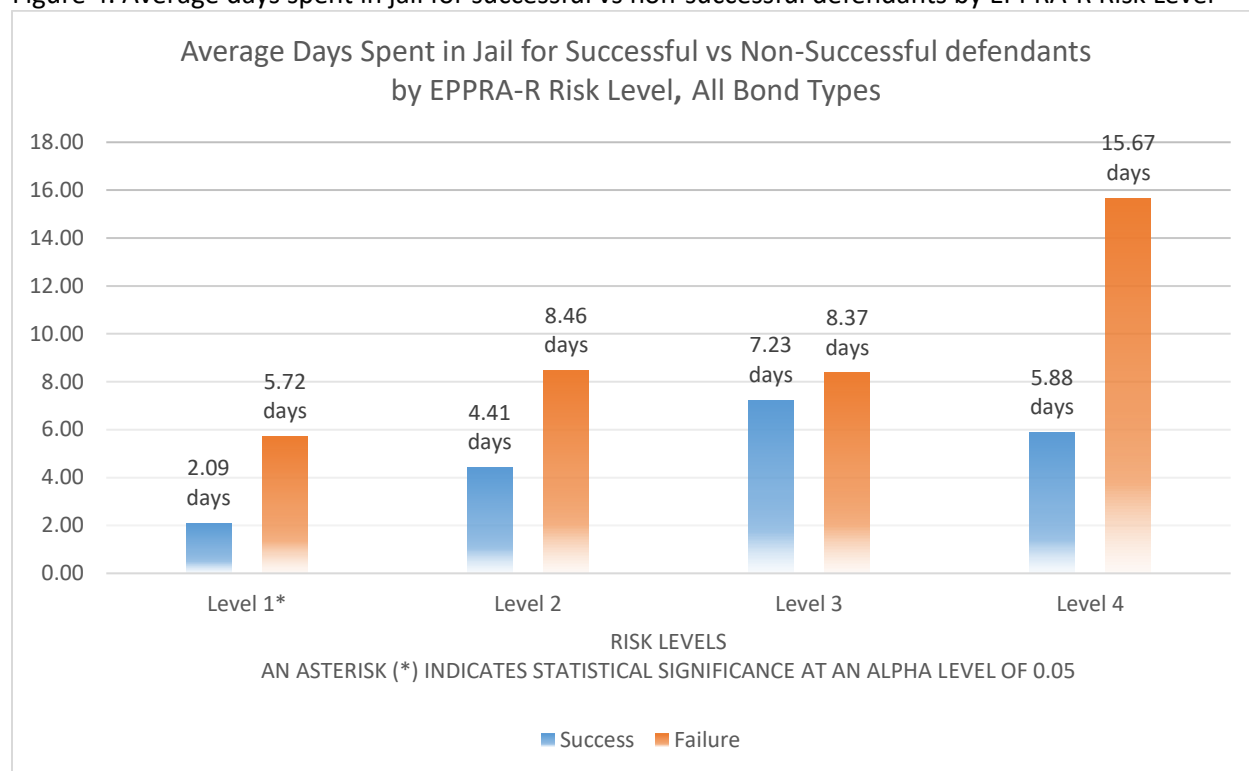
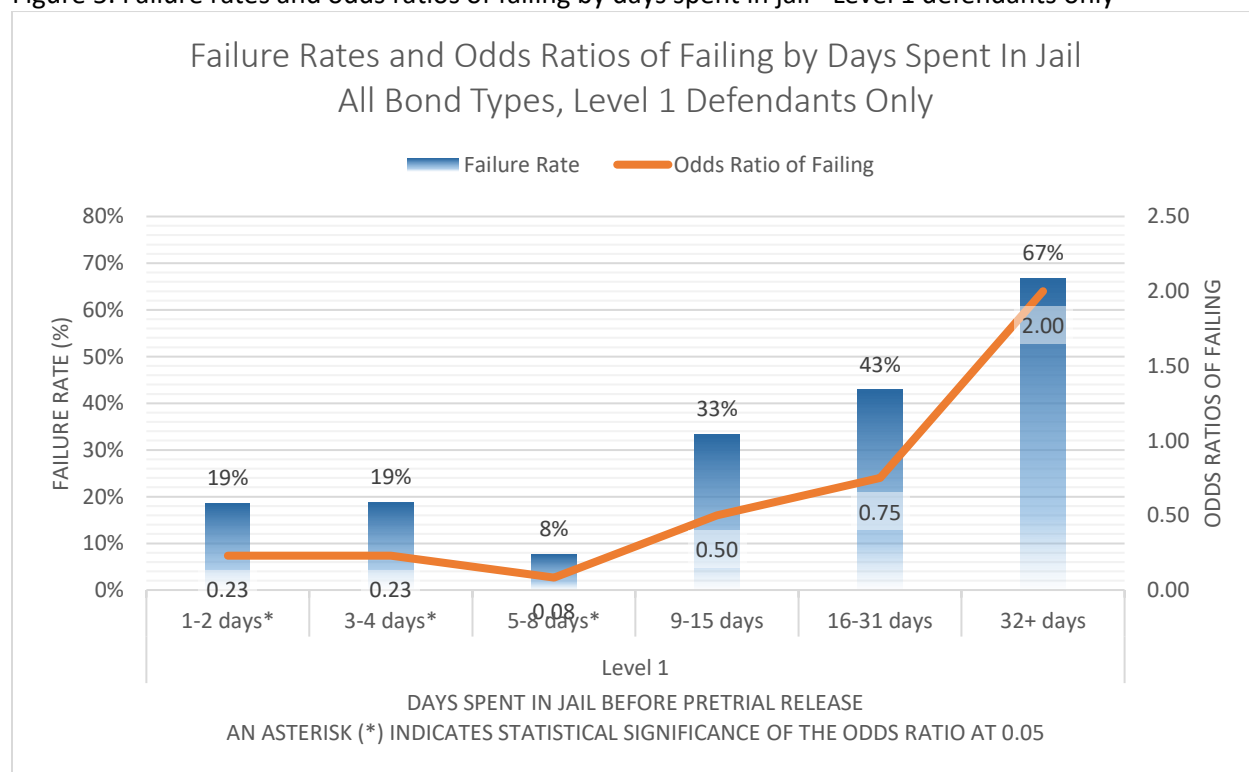
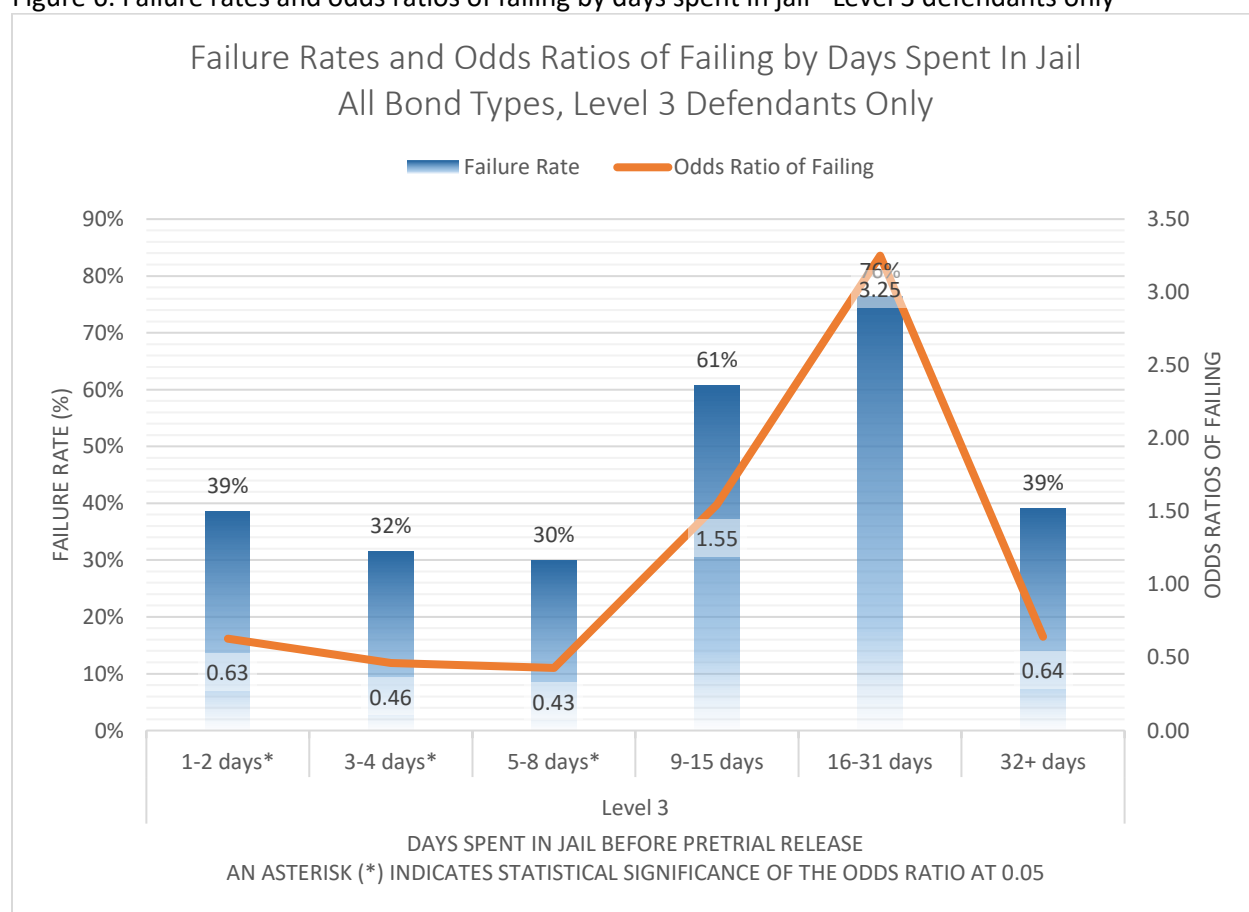


Figure 5. Failure rates and odds ratios of failing by days spent in jail - Level 1 defendants only



It is interesting to note that while there are little to no significant relationships in the data for Levels 2 and 4, Level 3 does have significant odds ratios for 1-8 days spent in jail. Figure 6 shows that Level 3 defendants released within 1-2 days are  $1/0.63=1.6$  times as likely to succeed as those who are not, defendants released within 3-4 days are  $1/0.46=2.2$  times as likely to succeed as those who are not, and defendants released 5-8 days are  $1/0.43=2.3$  times as likely to succeed as those who are not released in that time frame. Defendants who are released within 9-15 days are 1.55 times more likely to fail, but this odds ratio is not significant at  $\alpha=0.05$ , so more data must be analyzed to determine the accuracy of that odds ratio. The same applies to the remaining two categories of days in jail. However, the difference in failure rates between 5-8 days and 9-15 days is significant at  $\alpha=0.05$ , which mirrors the significance of the difference between 5-8 days and 9-15 days that was found for all defendants overall. Again, while more data is needed to determine if this significance exists across all remaining risk levels, the analysis supports that there is a significant increase in a defendant's propensity to fail during the pretrial period if that defendant is held for longer than 8 days, regardless of risk level—or at the very least, within Risk Levels 1-3.

Figure 6. Failure rates and odds ratios of failing by days spent in jail - Level 3 defendants only



## Failure Rates as a Function of Bond Type and Days Spent in Jail

Figure 7. Distribution of bond types

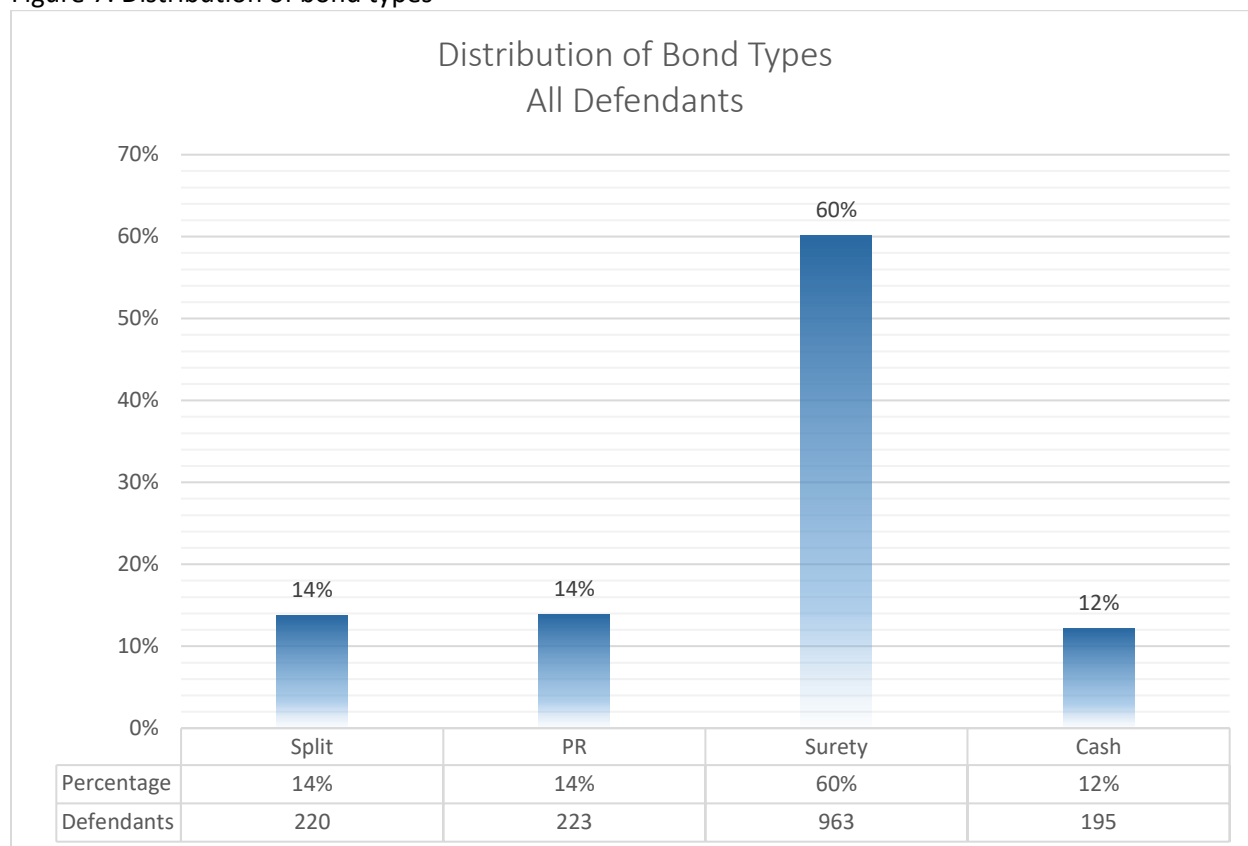


Figure 7 above shows that sixty percent of all defendants released on bond are released on surety, with the remaining defendants distributed roughly evenly between the remaining three bond types. Furthermore, 86% of all defendants released on bond had a monetary element that was required to be tendered before release. While the remaining 14% of defendants may have had a monetary element to be forfeited should they break any of their supervision requirements, that monetary element was *not* required to be tendered before release.<sup>2</sup> However, those 14% could have initially been offered a monetary bond amount that the defendant could have been unable to pay, and after some time, a judge could have amended the bond to become a PR bond, or a split bond with a monetary component that the defendant was able to afford. This can be employed when it is clear that a defendant will not be able to post a monetary bond at the current amount. While data was collected on the bond types “offered,” data entry was found to be inconsistent, and its fidelity is questionable. Bond type releases, however, were consistently entered since many different departments within El Paso County rely on the fidelity of that information, whereas bond types offered are not a source of information required by any department. Consequently, bond types based on *release* are presented here, whereas bond types based on *offering* are not.

<sup>2</sup> *Monetary element* does not include any court or personal bond fees as detailed in Chapter 17 of the Texas Code of Criminal Procedure.



Figure 8. Distribution of days spent in jail by bond type

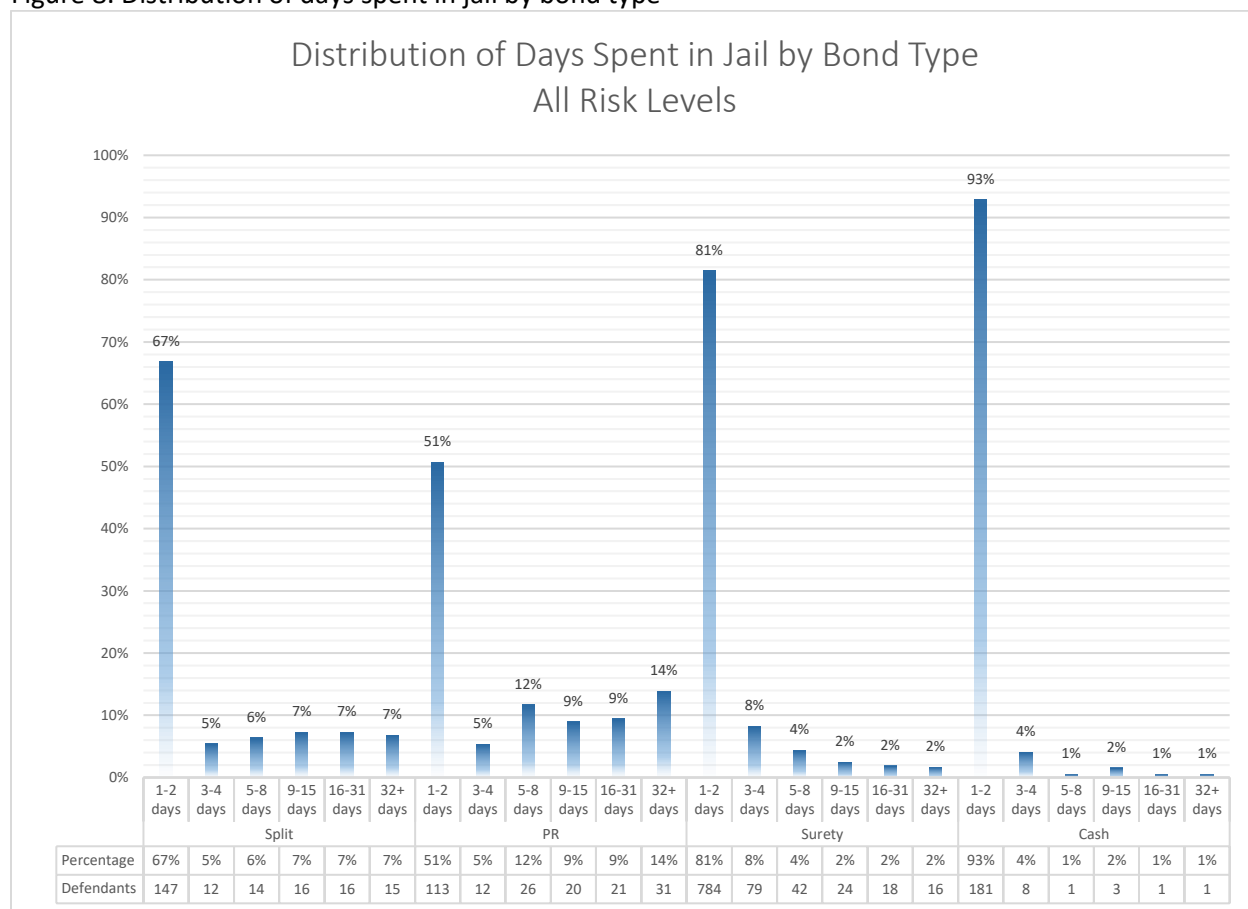


Figure 8 shows the distribution of days spent in jail by bond type. As is the case overall and when broken down by risk level, the majority of defendants are released within 1-2 days across all bond types. The lowest percentage of defendants being released within 1-2 days, as well as the highest percentage of defendants being released after 4 days, are those defendants who are released on PR bond.

Figure 9 shows the average number of days spent in jail from 2011 to March 31 of 2016. Note that data from 2011-2014 is from Dr. Fabelo's 2018 El Paso County Recidivism study, data for 2015 is extrapolated as the average from Fabelo's 2011-2014 data, and data for 2016 is from the dataset for this study, which only extends from January 1 to March 31, 2016 (Fabelo, Tyler, & Cohen, 2018). Historically, defendants on PR and split bonds have stayed in jail much longer than those on surety and cash bonds. While average length in jail for those on PR and split bonds decreased once the original EPPRA began to be administered, it is still much higher than either surety or cash bonds. Since PR bonds have no monetary component that is required to be tendered in order for the defendant to be released, it stands to reason that the average length of time in jail for those on PR bond should be the lowest among all bond types. Since Figure 8 and Figure 9 both show the opposite to be true, this suggests that some of these defendants may be released on PR bond once it becomes apparent that they cannot afford to post a monetary bond that is initially offered.

Figure 9. Average days in jail from 2011-2016 by bond type

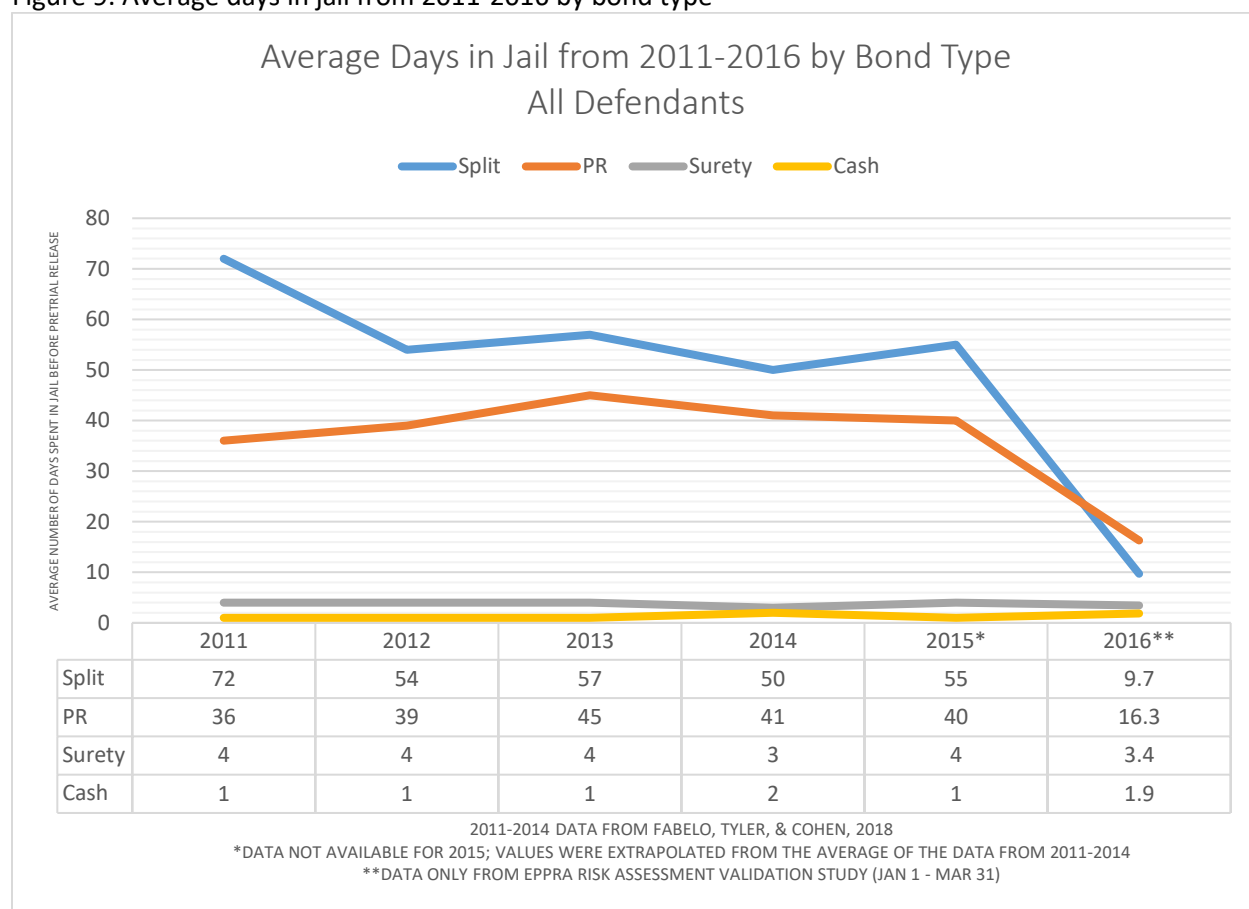


Table 25. Regression of any failure and days spent in jail by bond type

	Any Failure		Days Spent in Jail	
	Coefficient	P	Coefficient	P
Split Bond	-0.16	0.226	9.71	0.000
PR Bond	-0.06	0.639	16.30	0.000
Surety Bond	-1.03	0.000	3.43	0.000
Cash Bond	-1.18	0.000	1.86	0.000

Table 25 is a summary table showing the results from a logistic regression on any failure by bond type and a linear regression on days spent in jail by bond type. Note that the days spent in jail outcome is not the same categorical variable based on the categories established by Fabelo, Tyler, & Cohen (2018), but instead the original discrete variable on which the categorical version is based on, which is why that regression is a linear regression. For this reason, the logistic regression is expressed as log-odds instead of as odds ratios to avoid the possible misinterpretation that the coefficients on the linear regression are also odds ratios.

As Table 25 shows, only surety and cash bonds statistically predict any failure at an  $\alpha=0.05$ . This could be due to a low sample size for split and PR bonds, but as Figure 7 shows, there are roughly as many cash

bonds as there are split and PR bonds. Table 26 shows the odds ratios and corresponding  $p$ -values for each bond type by the categorical variable days spent in jail. Neither split nor PR bonds significantly predict pretrial failure within any of the days spent in jail categories. Furthermore, cash bonds only predict failure within 1-2 days, while surety stops significantly predicting pretrial failure after 8 days. In fact, with the exception of split bonds, the remaining three bonds exhibit larger odds to fail within 9-15 days compared to any previous odds ratios. Since there are no bonds that significantly predict pretrial failure after 9 days, these odds ratios remain inconclusive, and more data is needed. Nevertheless, the fact that surety bonds stop being predictive of pretrial failure at 8 days gives further evidence that pretrial failure depends much more on days spent in jail than it does on bond type given. Furthermore, since Table 25 shows that all four bond types *do* predict days spent in jail at an  $\alpha=0.01$ , there is strong evidence that certain bond types predict pretrial failure only inasmuch as they predict days spent in jail, and only inasmuch as days spent in jail predicts pretrial failure significantly within 8 days of being held.

Table 26. Odds ratios and corresponding  $p$ -values of any failure by bond type and disaggregated by days spent in jail (categorical)

	1-2 Days		3-4 Days		5-8 Days		9-15 Days		16-31 Days		32+ Days	
	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$
Split Bond	0.9	0.365	1	1.000	0.8	0.597	0.5	0.147	0.5	1.000	1.1	0.798
PR Bond	0.7	0.111	0.7	0.567	0.4	0.058	1.5	0.378	2.5	0.060	1.8	0.114
Surety Bond	0.3	0.000	0.4	0.001	0.4	0.017	1	1.000	1	1.000	0.5	0.147
Cash Bond	0.3	0.000	0.6	0.486	null		2	0.574	null		null	
Wald Chi-Square	238.05	0.000	12.20	0.016	9.59	0.022	3.19	0.526	3.53	0.317	4.66	0.198

## Days in Jail and other Pretrial Failure Outcomes

In terms of failing to appear,

Table 27 shows that every category significantly predicts FTA failure at an  $\alpha=0.01$ , but a defendant is not likely to fail in any particular category, which is to be expected considering the low rate of FTA for the entire sample (11% failure, see Table 1 on Page 7). It is also noteworthy that there is no significant difference between moving up each category and one's odds of failing to appear. In other words, defendants held between 1-2 days are  $1/0.11=9.1$  times less likely to FTA than those who are not, but there is not a significant difference between this group and those who are held between 3-4 days, who are  $1/0.12=8.3$  times less likely to FTA. The only statistical difference lies between defendants released within 1-2 days and defendants released within 16-31 days, with the latter being  $1/0.27=3.7$  times less likely to FTA, the chi-square between the two distributions being 7.79, and its corresponding  $p$ -value being significant at  $\alpha=0.01$ . Therefore, while a defendant's odds of failing to appear does appear to increase the longer that defendant stays in jail, those odds do not significantly increase except between defendants who are released within 1-2 days and those who are released within 16-31 days. This also holds true with FTA Level 2 defendants: the odds of a defendant does appear to increase as a defendant is held longer in jail, every category's odds do statistically significantly predict future FTAs, but a defendant moving up each category does not significantly increase their odds of failing to appear. Level

1 defendants' risk for FTA actually decreases slightly the longer they are held from 3-15 days, but those changes are also not significant at  $\alpha=0.05$ .

Table 27. Odds ratios and corresponding  $p$ -values for failing to appear by days spent in jail and disaggregated by FTA Risk Level

	FTA, All Risk Levels		FTA Risk Level 1		FTA Risk Level 2	
	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$
1-2 days	0.11	0.000	0.08	0.000	0.19	0.000
3-4 days	0.12	0.000	0.11	0.000	0.15	0.000
5-8 days	0.14	0.000	0.10	0.000	0.21	0.001
9-15 days	0.15	0.000	0.09	0.000	0.23	0.003
16-31 days	0.27	0.000	0.24	0.001	0.33	0.034
32+ days	0.19	0.000	0.26	0.000	0.06	0.005

Table 28 shows a similar story in the context of defendants being arrested on a new charge. Overall, defendants released within 1-2 days are  $1/0.24=4.1$  times less likely to be booked for a new charge than those who are not released within 1-2 days, while defendants released within 9-15 days are only  $1/0.54=1.9$  times less likely to be booked for a new charge than those who are not released within 9-15 days. Both of these odds are significant at  $\alpha=0.05$ , and these two groups are significantly different from each other, with a chi-square of 8.96 and a  $p$ -value of 0.0028. Looking at those in New Arrest Risk Level 1, defendants released within 1-2 days are  $1/0.16=6.3$  times less likely to be booked for a new charge than those who are not. Defendants in this group are significantly different than those released within 9-15 days, with a chi-square of 7.16 and a  $p$ -value of 0.0074, but the odds of failure or success of the latter are not significant, and is thus indeterminable without more data. Interestingly, while it seems that defendants released within 16-31 days are less likely to be arrested on a new charge than those released within 5-8 days, this difference is not significant, with a chi-square of 1.21 and a  $p$ -value of 0.2709. Furthermore, the 95% confidence interval for 16-31 days extends from  $1/0.07=14.3$  times less likely to be arrested on a new charge to only  $1/0.89=1.1$  times less likely, and since the 95% confidence interval of 9-15 days extends from [0.23, 1.48], it seems unlikely that 16-31 days would maintain a 0.25 odds ratio with more data, although it is possible.

Table 28. Odds ratios and corresponding  $p$ -values for new arrest for any new charge by days spent in jail and disaggregated by Any New Arrest (NA) Risk Level

	New Charge Overall		NA Risk Level 1		NA Risk Level 2		NA Risk Level 3		NA Risk Level 4	
	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$	Odds Ratio	$P$
1-2 days	0.24	0.000	0.16	0.000	0.30	0.000	0.4	0.000	0.69	0.404
3-4 days	0.32	0.000	0.1	0.000	0.47	0.013	0.71	0.567	0.67	0.662
5-8 days	0.38	0.000	0.30	0.003	0.28	0.003	0.75	0.595	empty	
9-15 days	0.54	0.019	0.58	0.257	0.57	0.122	0.38	0.149	empty	
16-31 days	0.65	0.112	0.25	0.032	0.79	0.550	1.17	0.782	0.5	0.578
32+ days	0.62	0.061	0.62	0.280	0.69	0.339	0.4	0.122	empty	

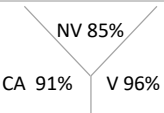
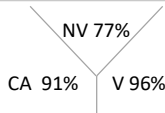
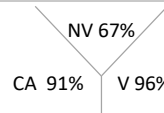
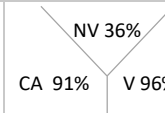
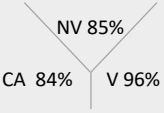
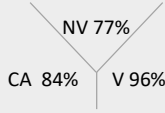
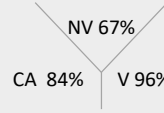
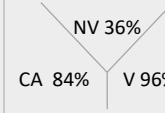
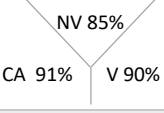
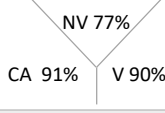
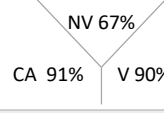
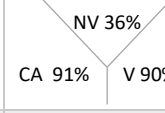
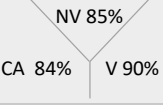
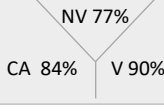
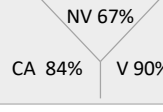
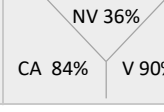
## Conclusions, recommendations, and future areas of study

The data supports that the amount of days a defendant spends in jail significantly predicts pretrial failure, with defendants being released within 8 days being significantly less likely to receive a warrant for committing a pretrial offense than those who are not. This holds true with the population overall, as well as specifically within Level 1 and Level 3 defendants. A study on Kentucky defendants from 2009 to 2010, conducted by the Laura and John Arnold Foundation, found that “when held 2-3 days, low-risk defendants were almost 40 percent more likely to commit new crimes before trial than equivalent defendants held no more than 24 hours. The study indicates that the correlation generally escalates as the time behind bars increases,” (The Laura and John Arnold Foundation, 2013). Although the data do not exactly mirror the Arnold Foundation’s findings, there is a statistically significant difference in pretrial failure between defendants being released within 5-8 days and defendants being released within 9-15 days. It is therefore recommended to release defendants within one week if the county wants to minimize pretrial failure. Not only will this save the county valuable tax dollars in terms of reduced costs of housing defendants in jail, but it will also save the county money and time in terms of a reduction of court cases as a result in a reduction of warrants issued for pretrial failure. This is especially true for defendants in Risk Level 1, and while this holds true for the entire population, more data needs to be analyzed to see if this recommendation applies reliably for every other risk level individually.

The data also supports that defendants on surety or cash bonds are more likely to succeed not because of the inherent characteristics of the bonds themselves, but because of the historic expediency of release in El Paso County as a result of these bonds types. However, those who cannot afford this expediency will typically not be released until 2-4 weeks after booking, which raises their inherent risk of pretrial failure. It is recommended to issue PR bonds as a first resort if appropriate in the opinion of a magistrate, and not as a last resort and not 2-4 weeks later if monetary bail cannot be secured by the defendant. Lastly, there is evidence that holding defendants longer than 2 days significantly increases their risk for failing to appear to a scheduled court date, while holding defendants longer than 8 days significantly increases their risk for being charged with committing any new crime. This further reinforces the recommendation to release defendants as soon as possible if the county wants to minimize jail costs, court costs, and court settings.

## Empirical Recommendation Framework

Table 29: EPPRA-R Risk Profiles

Successful Outcome Profile Matrix					
	Non-Violent 1	Non-Violent 2	Non-Violent 3	Non-Violent 4	
<b>Court Appearance 1</b>					<b>Violent 1</b>
<b>Court Appearance 2</b>					<b>Violent 1</b>
<b>Court Appearance 1</b>					<b>Violent 2</b>
<b>Court Appearance 2</b>					<b>Violent 2</b>

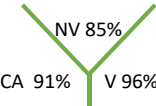
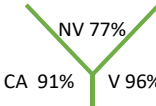
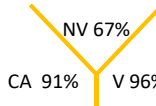
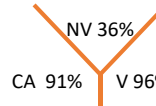
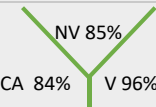
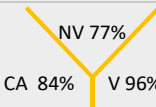
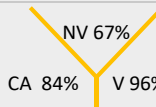
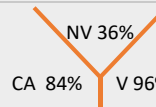
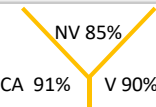
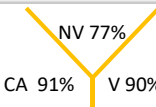
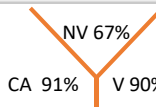
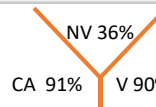
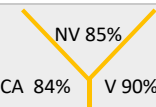
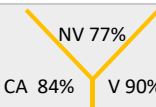
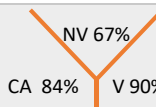
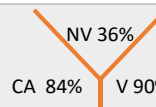
Procedural improvements can be developed to support the use of the EPPRA-R. It is recommended that a Decision Making Framework (DMF) Process be developed with the assistance of local stakeholders to provide recommendations regarding supervised pretrial release based on both the risk profiles of defendants and specific circumstances as determined by the local jurisdiction.<sup>3</sup> These supervision recommendations can be provided to the attorney, magistrate, and judge at first appearance. The DMF can suggest a recommendation that defendants with profiles associated with lower rates of pretrial success (Table 29) receive additional supervision supporting their pretrial success.

An example of a three level supervision DMF is provided below (Table 30).<sup>4</sup> For defendants with profiles associated with lower rates of pretrial success in relation to warrants issued due to missing a court hearing (FTA), non-violent arrest, and/or violent crime arrest, the DMF example suggests higher level of supervision if release is determined appropriate by the magistrate, judge, or locally identified appropriate party. Local resources available for increasing the likelihood of pretrial success may help determine the form of each supervision level.

<sup>3</sup> Yakima County, Washington, developed and implemented a Decision Making Framework as a recipient of the Smart Pretrial Demonstration Initiative grant (Brooker, 2017). Their framework is used as a reference to provide an example of how the risk assessment results can be applied effectively into court processes. See Appendix on Page 42 for a conceptualization of a tailorable El Paso County DMF process.

<sup>4</sup> We do not intend for the supervision example to be implemented. Instead, local stakeholders may take into account the Outcome Profile Matrix, policy, and available resources to determine how best to decide on supervision and release guidelines.

Table 30: Example of Risk Profile based Supervision Recommendations

Decision Making Framework – Outcome Profiles Matrix					
	Non-Violent 1	Non-Violent 2	Non-Violent 3	Non-Violent 4	
<b>Court Appearance 1</b>					<b>Violent 1</b>
<b>Court Appearance 2</b>					<b>Violent 1</b>
<b>Court Appearance 1</b>					<b>Violent 2</b>
<b>Court Appearance 2</b>					<b>Violent 2</b>
<b>Supervision Level</b>	<b>Level 1</b>		<b>Level 2</b>		<b>Level 3</b>

## Bibliography

- Acock, A. C., & Stavig, G. R. (1979). Measure of Association for Nonparametric Statistics. *Social Forces*, 57(4), 1381-1386.
- Bechtel, K., Lowenkamp, C. T., & Holsinger, A. (2011). Identifying the predictors of pretrial failure: A meta-analysis. *Federal Probation*, 75, 78-87.
- Brooker, C. M. (2017). Washington Pretrial Justice System Improvements: Pre- and Post-Implementation Analysis, Pretrial Justice Institute and Justice System Partners.
- Danner, M., VanNostrand, M., and Spruance, L. (2016). Race and gender neutral pretrial risk assessment, release recommendations, and supervision: VPRAI and PRAXIS Revised. Luminosity.
- Fabelo, T., Tyler, J., & Cohen, R. (2018). *El Paso County Uniform Recidivism Measure Project: Analysis of Trends and Key Policies*. New York City, NY: Council of State Governments Justice Center.
- The Laura and John Arnold Foundation. (2013). Pretrial Criminal Research.
- Picard-Fritsche, S., Rempel, M., Tallon, J.A., Adler, J., & Reyes, N. (2017). Demystifying Risk Assessment: Key Principles and Controversies Report.
- Secrest, G.McC. (2015-16). O'Connor's Texas Criminal Codes Plus. Jones McClure Publishing.
- Silver, E., & Banks, S. (1999). Predictive Power in Violence Risk Assessment Research: The Importance of Baserate-Sensitive Measurement. Unpublished.
- Singh, J., & Fazel, S. (2010). Forensic risk assessment: A metareview. *Criminal Justice and Behavior* 37:965–88.
- Silver, E., Smith, W. S., & Banks, S. (2000). Constructing actuarial devices for predicting recidivism: A comparison of methods. *Criminal Justice and Behavior*, 27(6), 733-764.
- Skeem, J. L., and Lowenkamp, C. T. (2016). Risk, race, and recidivism: Predictive bias and disparate impact. *Criminology*, 54, 680-712.
- Swets, J. A. (1988). Measuring the accuracy of diagnostic systems. *Science*, 240(4857), 1285–1293.
- Swets, J. A., Dawes, R. M., & Monahan, J. (2000). Psychological science can improve diagnostic decisions. *Psychological Science in the Public Interest: A Journal of the American Psychological Society*, 1, 1-26.



Szumilas, M. (2010). Explaining odds ratios. *Journal de l'Academie canadienne de psychiatrie de l'enfant et de l'adolescent / Journal of the Canadian Academy of Child and Adolescent Psychiatry* vol. 19,3, 227-9.

VanNostrand, M. (2003). *Assessing Risk among pretrial Defendants in Virginia: The Virginia Pretrial Risk Assessment Instrument*. Virginia Department of Criminal Justice Services.

## Appendix

### El Paso Pretrial Risk Assessment Instrument (EPPRA) Risk Factors

1. **Length at Address:** 1 Point if defendant has lived at their current residence for less than one year
2. **Current Offence (Most Serious):** 1 Point if primary charge is a felony or violent:
  - 2.1. Murder, Manslaughter, Kidnapping, Abduction, Robbery, Carjacking, Arson, Assault (simple assault or assault & battery/misdemeanor or felony), Sex Offences (Rape, Sexual Assault/Battery), Firearm Related
3. **Is Defendant Currently Under Supervision:** 1 point if defendant is currently under supervision or PR Bond
4. **Number of Prior Failures to Appear:** 1 point if defendant has two or more prior missed court hearings resulting in a warrant
5. **Number of Prior Violent Offences:** 1 point for having two or more prior violent convictions
6. **Any Pending Charges:** 1 point if defendant has any pending charges, does not include charges for which defendant is currently under supervision or on PR Bond
7. **Outstanding Warrants from Other Jurisdictions:** 1 point if defendant has any outstanding warrants from other jurisdictions
8. **Employed/Primary Caregiver:** 1 point if not continuously employed (6 months or more) or if not a primary caregiver for the past two years

### EPPRA Risk Levels

The eight EPPRA risk factors scores are totaled to create a score from 0 - 8 and are used to create five risk levels. The risk levels represent the likelihood of pretrial failure including failing to appear to a scheduled court hearing and causing danger to the community by being charged with a new crime pending trial.

Table 31: Appendix. EPPRA Risk Levels

EPPRA Risk Levels	EPPRA Score
Low Risk	0 - 1
Below Average Risk	2
Average Risk	3
Above Average Risk	4
High Risk	5 - 8

## EPPRA Risk Assessment Questionnaire Sheet

EPPRA Risk Assessments responses were captured by hand using the following document. This has been updated in 2018 with an excel worksheet with drop down cells and auto calculated scores for more clear and accurate assessments.

### Risk Assessment

Name: _____	DOB: _____	Gender: M/F	Race: _____	Score
Case/Warrant #: _____	SO #: _____	Booking Date: _____		<input type="text"/>
Current Address: _____	Length at Address: _____			

Current Offense (Most Serious): _____	Score
Additional Charge(s): _____	<input type="text"/>

Is Defendant Currently Under Supervision: _____	Score
Case No(s)/Charge: _____	<input type="text"/>

Number of Prior FTA's: _____	Score
Case No(s)/Charge: _____	<input type="text"/>

Number of Prior Violent Offenses: _____	Score
Case No(s)/Charge: _____	<input type="text"/>

Does defendant have any Pending Charges: _____	Score
CaseNo(s)/Charge/Court: _____	<input type="text"/>
Attorney of Record (Appt'ed/Retained): _____	

Does defendant have Outstanding Warrants from other Jurisdictions: _____	Score
Case No(s)/Charge: _____	<input type="text"/>

Current Employer/Primary Child Caregiver: _____	Score
Length of Time: _____	<input type="text"/>

Notes:
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Total Points: _____
Risk Level: _____

VPRAI Reference Risk Assessment 2003 (VanNostrand, 2003).

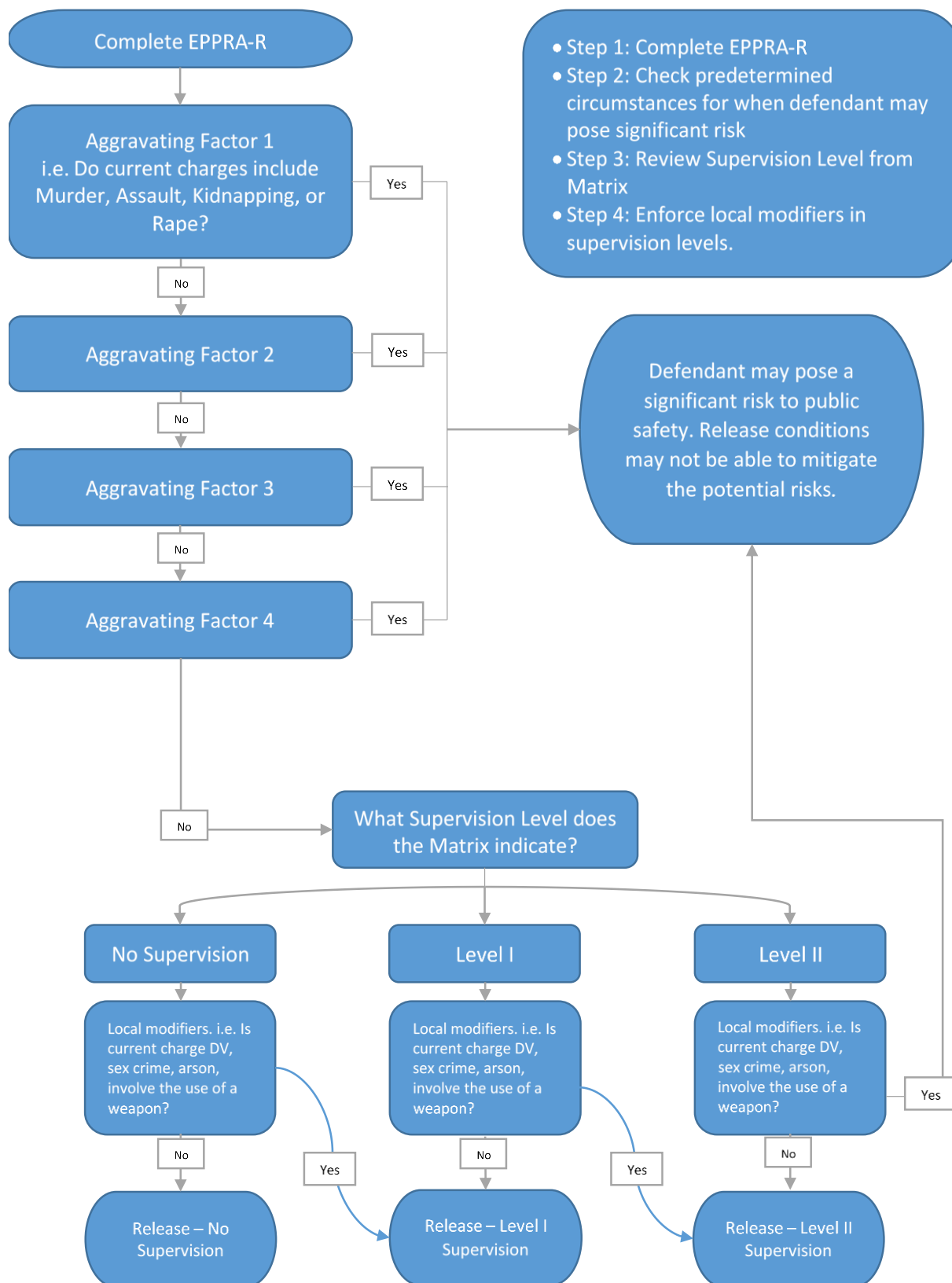
<b>Risk Factor</b>	<b>Criteria</b>	<b>Assigned Point(s)</b>
Charge Type	If the most serious charge for the current arrest was a felony	1 point
Pending Charge(s)	If the defendant had one or more charge(s) pending in court at the time of the arrest	1 point
Outstanding Warrant(s)	If the defendant had one or more warrant(s) outstanding in another locality for charges unrelated to the current arrest	1 point
Criminal History	If the defendant had one or more misdemeanor or felony convictions	1 point
Two or more Failure to Appear Convictions	If the defendant had two or more failure to appear convictions	2 points
Two or more Violent Convictions	If the defendant had two or more violent convictions	1 point
Length at Current Residence	If the defendant had lived at their current residence for less than one year prior to arrest	1 point
Employed/ Primary Child Caregiver	If the defendant had not been employed continuously for the past two years and was not the primary caregiver for a child at the time of arrest	1 point
History of Drug Abuse	If the defendant had a history of drug abuse	1 point

## Revised El Paso Pretrial Risk Assessment Instrument (EPPRA-R) Risk Factors

Figure 10. Risk Items and which Pretrial Failure Outcome they apply to in EPPRA-R

Risk Item found on EPPRA and EPPRA-R <i>Risk Item found on EPPRA only (not going forward)</i> <i>New Risk Item found on EPPRA-R only</i>	Does this risk item have to be asked in person?	Overall Failure	FTA	New Non-Violent Crime	New Violent Crime	Any New Crime
Lived at current residence less than 1 year?	YES	✓	✓	✓		✓
<i>Current charge felony or violent misdemeanor?</i>	<i>NO</i>					
Currently under supervision?	NO	✓			✓	✓
More than one prior FTA?	NO					✓
More than one prior violent offense?	NO	✓		✓		✓
Any pending charges?	NO	✓		✓		✓
<i>Any outstanding warrants in other jurisdictions?</i>	<i>YES</i>					
Unemployed or employed within 6 months?	YES	✓				
<i>Age 18.5 or under at the time of booking?</i>	<i>NO</i>	✓		✓	✓	✓
<b>Number of Risk Categories</b>		4	2	4	2	4
<b>AUC ROC of model based on Number of Risk Categories</b>		0.6149	0.5790	0.5887	0.6080	0.6067

## EPPRA-R Decision Making Framework (DMF) Process – Conceptualization



## EPPRA-R Risk Category Tables

***The current EPPRA risk categorization scale, with five categories for any pretrial failure from “Lower Risk” to “Higher Risk,” is replaced with four categories from “Level 1” to “Level 4.”***

Table 32. EPPRA-Revised risk categorization for any pretrial failure

Risk Score	Risk Category	Percentage of defendants who fail at each risk level
0	Level 1	20% of defendants
1	Level 2	30% of defendants
2	Level 3	40% of defendants
3-6	Level 4	49% of defendants

***The EPPRA-R contains two risk categories for being issued a warrant for failing to appear (FTA) to a court date.***

Table 33. EPPRA-Revised risk categorization for being issued a warrant for FTA

Risk Score	Risk Category	Percentage of defendants who fail at each risk level
0	Level 1	9% of defendants
1	Level 2	16% of defendants

***The EPPRA-R contains four risk categories for being charged with committing a new non-violent crime.***

Table 34. EPPRA-Revised risk categorization for being charged with committing a new non-violent crime

Risk Score	Risk Category	Percentage of defendants who fail at each risk level
0	Level 1	15% of defendants
1	Level 2	23% of defendants
2	Level 3	33% of defendants
3-4	Level 4	64% of defendants

***The EPPRA-R contains two risk categories for being charged for committing a new violent crime.***

Table 35. EPPRA-Revised risk categorization for being charged for committing a new violent crime

Risk Score	Risk Category	Percentage of defendants who fail at each risk level
0	Level 1	4% of defendants
1-2	Level 2	10% of defendants

***The EPPRA-R contains four risk categories for being charged with committing any new crime.***

Table 36. EPPRA-Revised risk categorization for being charged with committing any new crime

Risk Score	Risk Category	Percentage of defendants who fail at each risk level
0	Level 1	15% of defendants
1	Level 2	26% of defendants
2	Level 3	32% of defendants
3-6	Level 4	45% of defendants