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RETROSPECTIVE STUDY FOR THE USE OF THE ARNOLD PUBLIC SAFETY ASSESSMENT (PSA)



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SUBMITTED TO
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Executive Summary

The purpose of this study was to test the effectiveness of the Arnold Ventures' Public Safety Risk Assessment (PSA) in Vermont. This report presents the findings of the study. The Arnold PSA measures the risk of a person failing to appear for a court date (FTA) and engaging in new criminal activity (NCA) or committing a new violent crime (NCV) while out on bail. The PSA relies on criminal histories, the current charged offenses, and the age of the defendant to score the likelihood of a person engaging in the measured behavior. This research was conducted at the request of the Vermont stakeholder group of the National Criminal Justice Reform Project (NCJRP). The NCJRP was supported by the National Governors Association, Arnold Ventures, and the National Criminal Justice Association. This report was funded by the Bureau of Justice Statistics.

Key Findings

Overall, the PSA did not perform well in Vermont, and we do not recommend its adoption. It was unable to accurately predict who would not appear while on bail, commit a new crime, or commit a new crime of violence. Additionally, there are racial equity concerns about using criminal histories in criminal justice decision making.

The PSA may have performed poorly for a variety of reasons. First, the overall rate of failure to appear (FTA) for the cohort (people arraigned on felony charge in 2016-2017) was 11%. This is low; however, the real number of FTAs are likely higher, but they are not appearing in the official data. Because the PSA relies on criminal histories, the completeness and accuracy affect the score. Not all states report the same level of detail and completeness of records, therefore, the scores are likely off. New crimes of violence while out on bail were also low, with 14% of the cohort being arrested or arraigned with a new crime of violence. About 25% of the cohort committed a new criminal offense (excluding Violations of Conditions of Release), but the PSA did not accurately predict who would commit a new crime.

Introduction

As part of the National Criminal Justice Reform Project (NCJRP), sponsored by the National Governors Association, Arnold Ventures, and the National Criminal Justice Association, Vermont criminal justice stakeholders chose to explore evidence-based practices for pre-trial services. Specifically, focusing on risk assessments that would then help target needed supports for people out on bail, and perhaps reduce the number held due to bail they cannot afford or held without bail. The stakeholders voted to explore Arnold Foundation’s Public Safety Risk Assessment (PSA).

The Arnold PSA measures the risk of a person failing to appear for a court date (FTA) and engaging in new criminal activity (NCA) or a new violent crime (NCV) while out on bail. The score on the risk assessment is then to be used with the Arnold Foundation’s Release Conditions Matrix (RCM) tailored specifically to the jurisdiction. Below, Table 1 illustrates the matrix (Advancing Pre-Trial Policy & Research, 2022). On the RCM, the FTA and NCA scores are used to determine a person’s “release level.” Each level is associated with release conditions (which are also tailored to the jurisdiction). For example, the conditions of release level 1 might be just the state requirements of being on bail (appear when required, don’t commit another crime, etc.). Release level 2 conditions might include text reminders to appear. Conditions for

release level 3 might include criminal history checks to make sure the defendant has not been arrested and in person check ins with a pre-trial monitor.

The NCJRP project funded the initial retrospective study. That study tested the PSA on all defendants arraigned in Vermont during 2016-2017 and used only Vermont criminal histories. During that initial pass, Vermont learned that its overall FTA rate is very low at approximately 6%, and that only

Table 1. Release Conditions Matrix

Failure to Appear (FTA) Scaled Score	New Criminal Activity (NCA) Scaled Score					
	1 91% Likely Arrest-Free	2 85% Likely Arrest-Free	3 78% Likely Arrest-Free	4 68% Likely Arrest-Free	5 55% Likely Arrest-Free	6 47% Likely Arrest-Free
1 89% Likely to Appear	Release Level 1	Release Level 1				
2 85% Likely to Appear	Release Level 1	Release Level 1	Release Level 1	Release Level 1	Release Level 2	
3 81% Likely to Appear		Release Level 1	Release Level 1	Release Level 1	Release Level 2	Release Level 3
4 73% Likely to Appear		Release Level 1	Release Level 1	Release Level 1	Release Level 2	Release Level 3
5 69% Likely to Appear		Release Level 2	Release Level 2	Release Level 2	Release Level 2	Release Level 3
6 65% Likely to Appear				Release Level 3	Release Level 3	Release Level 3

about 5% of all defendants are charged with a new crime while out on bail and less than one percent of defendants commit a new crime of violence while out on bail. Overall, the PSA did not work on the Vermont cohort. Stakeholders agreed that exploring the PSA on a targeted subset of defendants and with the addition of out-of-state criminal histories was worthwhile. This report presents those findings.

Data Sources

The PSA relies only on the official criminal histories (rap sheets) of the defendants. Criminal histories are created at each state level and the federal level. The FBI manages the National Crime Information Center (NCIC) which coordinates the dissemination of criminal histories when requested by a jurisdiction. Criminal histories are fingerprint supported, meaning that for the event to appear on the rap sheet, the person must be fingerprinted to confirm their identity. This prevents the conviction of one John Doe appearing on the rap sheet of a different John Doe.

We requested the criminal histories of the defendants in our cohort. NCIC then sent the request to the states and the states returned any existing rap sheets. All 50 states and the federal government returned rap sheets. Forty-two percent of the cohort had a returned rap sheet from out of state. The histories were then hand scored by the author, using the PSA rubric.¹ States varied on the completeness of the criminal histories. For example, there were 196 people in our cohort who had a rap sheet in Massachusetts, but less than 20 had an actual criminal conviction in Massachusetts. Most of the Massachusetts histories scored contained arrest information, but no court information. The completeness affects the accuracy of the PSA.

Racial Equity

Criminal histories do not measure the culpability of an individual. They measure the criminal justice system's response to an individual. From arrest to release and parole, the criminal justice system's response is a series of discretionary actions by police, prosecutors, judges, and corrections officials. Criminal histories record the outcome of those discretionary activities. A person in Vermont may be charged with disorderly conduct while the same conduct might result in a charge of assault in a different jurisdiction. One individual may be charged

¹ We are thankful to NLETS for stretching their parsing service to meet our request. In the related [data quality assessment](#), we explain why we did not have enough time to write and test the code to make use of this service.

with a felony, when the same conduct would result in a misdemeanor charge for another individual. These decisions are recorded in the criminal histories and then scored in risk assessments, as though they were indicative of a person's culpability or past behavior. They may not be.

Scholars have argued that over policing of people of color and the systemic exclusion of people of color from socio-economic parity results in risk assessment based on criminal histories and/or socio-economic factors, being a proxy for race. (Harcourt, 2015), (Starr, 2014 & 2015). To explore these critiques, one must test the results of a risk assessment or examine decision-making for bias. (DeMichele, 2018). The argument is that if the risk assessment does not result in disparate impact for people of color, then the tool will not contribute to systemic racism. However, we agree with scholars who argue that there is another layer of bias embedded in using the records of a racist system that created an unmeasurable bias in risk scores and outcomes. (Eckhouse, Lum, Conti-Cook, & Cicciloni, 2019). It is important for stakeholders to understand these arguments when evaluating whether the PSA would further Vermont's goal of racial equity.

Methods

The Court Adjudication Database maintained by CRG was used to identify a cohort of individuals with at least one felony charge in 2016 or 2017. These are individuals who were most likely to be held without bail or held on a very high bail. Individuals who were incarcerated during the period in between their arrest and disposition were excluded from the cohort. Vermont criminal histories were obtained in addition to out-of-state and federal criminal histories. The final cohort included 3,742 people.

The cohort was then scored according to the three scales. Regression analysis was performed to determine if the scale factors were predictive of the defendant's subsequent behavior. The results are presented as what factors were statistically significant and what were not statistically significant. Then, the Area Under the Curve (AUC) was calculated to determine how accurately the model could predict the expected behavior. An AUC of .50 indicates that the model is no better than chance. A score of 1 indicates the model is perfect. For risk assessments in criminal justice, the following scale has been used to judge the predictive ability of assessments: AUCs of 0.54 and below are poor, 0.55 to 0.63 are fair, and 0.64 to 0.7 are good, with values higher than 0.71 being excellent. (Desmarais & Singh, 2013), (DeMichele, 2018).

Description of the Cohort

Table 2 shows the geographic and demographic breakdown of the cohort. A similar number of individuals in the cohort were arraigned in Bennington, Chittenden, Franklin, Rutland, Washington, Windham, and Windsor counties (~ 10-12% each) (see Table 2 for the full County breakdown). At the time of arraignment, the average age of the 3,742 individuals was 35 (SD=12). A majority were male (79%).² Further, the race of most of those in the cohort was White (92%) followed by Black (6.5%). Asian and Indigenous people comprised less than 1% of the cohort. The race of 1.2% of individuals was Unknown. Notably, ethnicity information was missing for a majority (84%) of people in the cohort, while 16% were recorded as non-Hispanic and 0.5% were Hispanic.

Table 3 shows the types of charges faced by individuals in the cohort. Because a person can receive multiple charges, individuals in the cohort can appear more than once in this table. The types of charges are broken down further by level of severity (i.e., felony or misdemeanor). Most felony charges faced by individuals in the cohort fall into the categories of domestic (818) and drug (808) offenses, followed by theft (760), public order (682), DUI (601), and assaults (576). Most misdemeanor charges were public order offenses (1,216). The next most common offense categories for the cohort’s misdemeanor

Table 2. Cohort Demographics

Characteristic	N = 3,745*
Age at Arraignment	35 (12)
County	
Addison	144 (3.8%)
Bennington	425 (11%)
Caledonia	210 (5.6%)
Chittenden	413 (11%)
Franklin	402 (11%)
Grand Isle	36 (1.0%)
Lamoille	94 (2.5%)
Orange	95 (2.5%)
Orleans	302 (8.1%)
Rutland	410 (11%)
Washington	373 (10.0%)
Windham	400 (11%)
Windsor	441 (12%)
Sex	
Female	770 (21%)
Male	2,966 (79%)
Race	
Asian	22 (0.6%)
Black	236 (6.5%)
Indigenous	7 (0.2%)
Unknown	43 (1.2%)
White	3,326 (92%)
Ethnicity	
Hispanic	20 (0.5%)
Missing	3,129 (84%)
Non-Hispanic	595 (16%)

*Mean (SD); n (%)

² Criminal Histories ask for the defendants’ sex, not gender identity. The options are Male, Female, Unknown. The data are self-reported. It is possible that people are reporting their gender identity, however, criminal history forms do not recognize non-binary individuals or other gender diverse individuals.

Table 3. Cohort Charges

Crime Category	Felony	Misdemeanor
Domestic	818	283
Drugs	807	198
Theft	760	251
Public Order	682	1216
DUI	601	116
Assaults	576	363
Sex Offenses	480	33
Fraud	351	84
Motor Vehicle	236	387
VAPOs	96	51
GNO	52	150
Robbery	52	*
Weapons	45	22
Homicide	24	*
Arson	22	*
NA	*	*
Fish and Game	*	*

charges include- motor vehicle (387), assaults (363), domestic (283), and theft (251). Other common categories for the cohort’s felony and misdemeanor charges can be found on Table 3.

Table 4: FTA Rates by County

County	% Of Cohort Who Did Not FTA	% Of Cohort Who Did FTA
Addison	90.34%	9.66%
Bennington	88.73%	11.27%
Caledonia	88.10%	11.90%
Chittenden	89.51%	10.49%
Franklin	90.80%	9.20%
Grand Isle	88.89%	11.11%
Lamoille	95.74%	4.26%
Orange	92.63%	7.37%
Orleans	94.70%	5.30%
Rutland	91.71%	8.29%
Washington	87.40%	12.60%
Windham	77.06%	22.94%
Windsor	91.38%	8.62%

*Indicates 5 or fewer charges

Findings

Failure to Appear (FTA) Scale

The FTA Scale measures whether a defendant is likely to appear for all court proceedings.

Table 4 shows the FTA rate for this cohort by county. FTAs are recorded in Vermont criminal histories only if a warrant is issued for the defendant’s failure to appear. Stakeholders assert that many times a warrant is not issued. This study does not address that claim. However, it is important to note that if a person’s FTA is in the data, it is the result of a discretionary act taken by the judge. It is likely that discretion is wielded differently in each county.

Almost one quarter of Windham County’s cases in this cohort had a warrant issued for a failure to appear. This was almost 10 percentage points higher than Orleans County, which had the lowest FTA rate at 4.26%. Most counties hovered around 9 or 11%. The statewide average was 10.92%.

Table 5 illustrates the factors in the FTA scale and the numbers and percent of the cohort by how they scored on those factors. These data include the out-of-state criminal history information. However, the accuracy and completeness of some of the states’ data is questionable. We did not calculate if the defendant had a pending case in another jurisdiction because we could not determine with any degree of certainty for all states whether a case had been filed.

Factor	Status	Number	Percent
Pending Charge	Yes	588	15.70%
	No	3,157	84.29%
Prior FTA in Past Two Years	Two +	292	7.79%
	One	12	0.32%
	None	3,441	91.88%
Prior FTA Older than Two Years	Yes	333	8.89%
	No	3,412	91.10%
Prior Conviction	Yes	2,760	73.70%
	No	985	26.30%

We did include prior FTAs, but many states did not record the dates or report FTAs with any consistency. Further, states may wait, as does Vermont, for a warrant to be issued before it appears on the rap sheet. Therefore, it is likely that the true out-of-state FTA count is lower. We included Vermont and out-of-state prior convictions. This,

however, introduces that first layer of bias. There were several people, for example, who had convictions for jumping fare turnstiles in New York City. These convictions are likely part of the various policing initiatives that were later found to be targeting communities of color.

Layering of bias, or perhaps layering of sanctions, may also be evident in the factor of “Prior FTA in the Past Two Years.” This factor is largely measuring whether a Vermont judge issued a warrant on an FTA. It is possible that a judge sees the defendant had a prior warrant issued and issues another one. This would compound any initial bias or geographical disparity. In this scale of the PSA, having two or more prior FTAs is worth 4 points out of a possible 7.

The scaled FTA (on a possible 6-point scale) is presented below in Table 6. Higher scores did produce higher rates of FTA for the cohort. However, the only factors that were statistically significant in the regression model were: prior FTA in the last two years ($p = .000$), total prior convictions ($p = .000$), and total prior FTA older than two years ($p = .03$). Current pending charges were not statistically significant ($p = .95$). The AUC³ of this model was .61, or fair, under the scale. Given the concerns about the underlying data, equity, and fairness, we do not recommend this scale for use in Vermont.

Table 6. FTA Scores, Totals, and Percentages

Scaled Score	Total	%FTA
1	814	6.01%
2	2034	10.17%
3	535	13.45%
4	99	22.22%
5	248	23.38
6	15	6.67%
Total	3,745	10.92%

New Criminal Activity (NCA) Scale

This scale measures the likelihood of a person committing a new crime whilst out on bail. Although this appears to be a straightforward measure, in Vermont it is complicated by its crime of Violations of Conditions of Release (VCOR) found in Title 13 of the Vermont Statutes Annotated, Section 7559(e). When a person is released on bail, the judge imposes conditions. These conditions include not committing a new crime, but also include status offenses, such as, not drinking alcohol or not checking in with the police department at regular intervals. This is a crime for which one can be convicted and sentenced.⁴ We tested the model with and without the inclusion of VCOR.

On the next page, Table 7 presents the factors in the NCA scale. This scale includes the age of the defendant and more detail on the prior crimes, including whether there was a sentence to incarceration. These new factors also add new layers of disparity. As discussed below, they add demographic, geographic, and racial disparities.

³ All analysis was completed in R. AUC was calculated using the pROC package (Robin, et al., 2011).

⁴ CRG received funding from the Bureau of Justice Statistics to further study the use of Violation of Conditions of Release.

Table 7. NCA Factors and Percentages

Factor	Status	Number	Percentage
Age at Current Arrest	23 or Older	3136	83.73%
	22 or Younger	609	16.26%
Pending Charge	Yes	588	15.70%
	No	3,157	84.29%
Prior Misdemeanor Convictions	Yes	2,711	72.38%
	No	1034	27.61%
Prior Felony Conviction	Yes	1392	37.16%
	No	2353	62.83%
Prior Crime of Violence Conviction	Yes: 1 or 2	988	26.38%
	Yes: 3+	632	16.87%
	No	2125	56.74%
Prior Incarceration	Yes	1060	28.30%
	No	2685	71.69%
Prior FTA in Past Two Years	Two or More	292	7.79%
	One	12	0.32%
	None	3,441	91.88%

According to the Vermont Department of Health (2022) population estimates, Vermonters of color are younger, overall, than White Vermonters. The largest age group of Black Vermonters⁵ is the 20–24 age group, followed by the 15–19-year-old group. The NCA scales weigh more heavily people under 22. For Black defendants in the cohort, 20% were under the age of 23. Only 15% of the White defendants were under 23. The chi-squared test of significance found that race was related to age ($p = .05$).

The NCA scale also scores prior incarceration, prior felony convictions, prior misdemeanor convictions, and prior convictions of violence. The criminal histories of the cohort went as far back as 1976. A sentence of incarceration in 1976 is counted the same as a sentence of incarceration in 2006. A person who is sentenced to 10 years’ incarceration for a felony is scored the same as someone who plead guilty to the time served over the weekend while they were held waiting bail. Some states had a “fine or time” sentence where the defendant could choose to pay the fine imposed or spend a set time in jail. There is a substantial risk that this

⁵ We don’t present the analysis for Asian or Indigenous people in the cohort because reporting on small numbers risks identifying someone.

factor is counting poverty, which disproportionately affects people of color in this country (US Census, 2022).

This scale also counts misdemeanor and felony convictions. There is no nationwide definition of felony or misdemeanor. Theft of goods over \$500 may be a felony in one jurisdiction and a misdemeanor in another. Crimes that were a felony on a person’s record may not be considered a felony now. For example, a jurisdiction may have raised the threshold of felony theft from \$500 to \$1,000. The PSA tool scores the \$500 theft as a felony, regardless of its current status. This introduces a level of geographic disparity into the tool.

Table 8 shows the scaled score of the NCA and the percentage of people who committed any new crime at all, including those who were only charged with VCOR, and then removing those who were only charged with VCOR.

Table 8. NCA Scores Including and Excluding Violations of Conditions of Release

Scale	# Of People Any New Crime	% Of People	# Of People New Crime NOT VCOR	% Of People
1	109	19.36%	85	15.09%
2	322	28.17%	262	22.92%
3	361	33.89%	287	26.94%
4	263	58.83%	216	30.42%
5	97	45.11%	50	23.25%
6	24	51.02%	20	40.81%
Total	1,176	31.40%	953	25.44%

We ran the model with all crimes counting as a new crime, and then again with VCOR not counting as a new crime. Regardless, the following factors were statistically significant: age under 23 (p = .005), pending charges (p = .000), prior misdemeanor (p = .000), prior crime of violence (p = .008). Prior felonies and prior incarcerations were not statistically significant. With the VCOR the AUC was .58 (fair) and without was also .58 (fair). We do not recommend this scale for Vermont.

New Crime of Violence (NCV) Flag

This assessment flags whether the defendant is at risk of committing a new crime of violence. It adds three new factors: whether one of the current charges on the docket is a crime of

violence, whether the defendant was under 21 at the time of the current violent offense, and the number of prior convictions for a violent offense. These new factors add another layer of potential disparity. Testing this scale in San Francisco, scholars found that overbooking (arresting for an offense of violence that is not then filed) of defendants, particularly defendants of color, led to unwarranted higher scores. (Lum, Boudin, & Price, 2020). As such, we used the charges filed at arraignment as it was the most accurate data available. Black defendants in our cohort were overrepresented in the categories of defendants under the age of 21 and having a current charge of violence; approximately 6% of the Black defendants were included in that category, as opposed to 2.6% of White defendants.

Table 9. NCV Factors and Cohort Scores

Factor	Status	Number	Percentage
Current Charge of Violence	Yes	1522	40.64%
	No	2223	52.39%
Under 21 and Current Charge of Violence	Yes	114	3.04%
	No	3631	96.95%
Pending Charge	Yes	588	15.70%
	No	3,157	84.29%
Prior Conviction	Yes	2,760	73.70%
	No	985	26.30%
Prior Crime of Violence Conviction	3 or more	632	16.8%
	1 or 2	988	26.38%
	None	2125	56.74%

This scale is weighted, and then low scores are classified as low risk for a new crime of violence and higher scores as high risk. Table 10 shows the flag the scale recommended, and the percent of people arrested for a new crime of violence.

Table 10. NCV Flag Predictability

Flag	Committed NCV	Percent Correct
No	213	8.18%
Yes	162	14.16%

The regression model found the following factors to be statistically significant at the $p = .000$ level: prior crime of violence score, current crime of violence, and pending charge. The following were not statistically significant: under 21 and a new crime of violence, prior convictions. The AUC of the model was .61

(fair). We do not recommend the scale for Vermont.

Conclusion

The Arnold PSA measures the risk of a person failing to appear for a court date (FTA) and engaging in new criminal activity (NCA) or a new violent crime (NCV) while out on bail. Overall, Vermont has a low reported FTA rate (6% for all defendants, 11% for the cohort studied of arraigned felony defendants). Approximately 25% of defendants committed a new criminal offense (that was not Violations of Conditions of Release), while out on bail and about 14% of defendants committed a new crime of violence.

Although some factors in the PSA were statistically significant in predicting behavior, the overall performance of the tool was not predictive. There are concerns about the quality and completeness of the underlying data from other states. Further, there are serious concerns about layering of racist decisions and policies for the purpose administering justice.

Vermont's pretrial services and other organizations should continue to work to provide support and outreach for those on bail. This may help reduce new crimes committed while on bail. Further research should also include a trajectory of new crimes to help understand the types and frequency of new criminal offenses committed while on bail.

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