

RISK ASSESSMENT FACTSHEET

Public Safety Assessment (PSA)

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Who created the risk assessment?

The risk assessment was created by Dr. Marie VanNostrand and Dr. Christopher Lowenkamp, who were contracted to create the assessment by the Laura and John Arnold Foundation (now Arnold Ventures).

How large was the training data set?

The training dataset consisted of 1.5 million cases, of which only about 750,000 were used in the creation of the risk assessment. Data that was excluded was left out for a variety of reasons, including incompleteness of data and data pertaining to individuals who were detained in the time frame considered.

How was the training data set collected and assembled (i.e., what jurisdiction(s) is it from)?

The data was collected from pretrial records assembled from nearly 300 jurisdictions across the U.S. Some of the data is the same data used to create other risk assessments. For example, the data used to create the Colorado Pretrial Assessment Tool (CPAT) was also used in the creation of the PSA.

Over what time frame was the data collected?

The training data included data from October 2001 through December 2011.

What factors (i.e., defendant characteristics) were included in the data set? This question pertains to all the factors that were available about defendants, not necessarily all the factors that were used to train or develop the model.

Hundreds of factors were included, which pertained to prior arrests and convictions, prior failures to appear, drug and alcohol use, mental health, family situation, employment, residence and more. The developers also wanted to explore whether factors collected from in-person interviews added predictive power to a risk assessment, so they included both factors from interviews and factors not from interviews (such as pending case details or criminal history).

Does the dataset include instances of defendants who were detained? If so, does the data include outcomes for those people (i.e., did the data account for counterfactual estimation; if so, how)?

The approximate 750,000 cases that were considered in the model development process were only defendants who had been released at some point in the pretrial process.

Are there any known issues or errors with the data?

Given the volume of the data, it is infeasible to outline every issue. However, key issues to be aware of include the challenges of using data from many different jurisdictions, which could suffer from sample bias and measurement error.

In what year was the risk assessment created?

Preliminary research began in 2011 and the risk assessment was completed in 2013.

What factors, among all the factors in the training data, were considered in the development of the risk assessment? If not all factors were considered, how were those that were considered chosen?

Among the hundreds of factors available, many or all factors were tested or explored in the development process.

How were factors that were considered ultimately chosen for exclusion or inclusion in the final model (the risk assessment itself)?

The factors ultimately chosen for each scale were selected based on their predictive abilities. “The researchers identified nine factors that were the most predictive — across jurisdictions — for new crime, new violent crime, and failure to appear. Factors were drawn from the existing case and from the defendant’s prior criminal history.” Furthermore, the researchers found that “for all three categories, the addition of interview-dependent variables did not improve the risk assessment’s predictive performance.” (see Source 4)

Does the final model include as a factor(s) arrests that did not lead to convictions?

The PSA includes ‘pending charge at the time of the offense’ as one of the 9 considered factors. It is important to note that such pending charges may or may not ultimately lead to a conviction.

Does the final model include socioeconomic factors such as housing and employment status? Does the final model include personal health factors such as mental health or substance abuse?

The final model does not include these factors.

How were weights assigned to each factor included in the final model? (rounding correlation coefficients, Burgess Method, etc.)

Each of these factors is weighted—or, assigned points—according to the strength of the relationship between the factor and the specific pretrial outcome. According to Dr. Lowenkamp, “Weights were assigned based on the odds ratios from logistic regression coefficients. In an attempt to provide easier scoring and increase generalizability, the odds ratios were rounded.”

How does the final model define outcomes (i.e., during the model development process, was there a distinct outcome defined for each type of failure (flight risk, new crime, new violent crime, etc.) or were outcomes compounded? What does the output of the model look like (i.e. a score on a scale of 1-10, etc.)?

The PSA includes three separate scales, each of which calculates a score for one of the following outcomes: failure to appear (FTA), new criminal activity (NCA) and new violent criminal activity (NVCA).

What does the output of the model look like (i.e. a score on a scale of 1-10, etc.)?

The FTA model is scored numerically on a scale of 0-7. The NCA model is scored on a scale of 0-13. The NVCA model is scored on a scale of 0-7.

The state of Kentucky requires risk levels to be output by the risk assessment, so Kentucky uses a version of the PSA that outputs risk levels (e.g., low, moderate, high). Christopher Lowenkamp designed these levels.

Does the model output risk level designations or convert raw scores into risk level designations such as “low risk,” “moderate risk,” and “high risk”?

Yes -- Scores for NCA and FTA are converted to separate scales of one to six, with higher scores indicating a greater level of risk. Scores for NVCA are converted into a binary NVCA flag (either “Yes” or “No”).

What proportion of samples in the training data set failed at each risk score and/or level (i.e., what percentage of people with a score of 5 or a label of “moderate risk” actually failed to appear)?

Based on the originally developed risk scales:¹

For the New Criminal Activity scale:

New Criminal Activity Risk Score	New Criminal Activity Rate
1	10%
2	15%
3	23%
4	30%
5	48%
6	55%

For the New Violent Criminal Activity scale:

New Violent Criminal Activity Risk Score	New Violent Criminal Activity Failure Rate
1	1.3%
2	2.5%
3	3.9%
4	4.3%
5	6.1%
6	11.1%

For the Failure to Appear scale:

Failure to Appear Risk Score	Failure to Appear Failure Rate
1	10%
2	15%
3	20%
4	31%
5	35%
6	40%

¹ See Source 4

Did the model developers assess the predictive validity of the model? If so, how (reported AUC, FPR, TPR, etc.)?

The researchers plotted, for each scale, the percentage of failures in the training data as a function of risk score. They found that the “likelihood of negative pretrial outcome increases with each successive point on the scale.” (See Source 4) Researchers also calculated AUC-ROC values as well as true positive rates (TPR) and false positive rates (FPR) using the training data set.

During this development process, the “PSA was further validated using historical data from one state and one major city.” Researchers also found that “defendants in each category failed at similar rates, regardless of their race or gender.” (See Source 4)

Where is the risk assessment used?

The PSA is used statewide in Kentucky, Arizona, New Jersey, and Utah. It is also used in counties including Cook County (Chicago), Illinois; Harris County (Houston), Texas; Maricopa County (Phoenix), Arizona; San Francisco County, California; Mecklenburg County (Charlotte), North Carolina; Allegheny County (Pittsburgh), Pennsylvania; Lucas County (Toledo), Ohio; Minnehaha County (Sioux Falls), South Dakota; Milwaukee County, Wisconsin; Santa Cruz County, California, and New Orleans, LA.

Arnold Ventures has also announced that beginning in 2019, they will be conducting research and implementing the PSA in up to 10 different jurisdictions across the country. More jurisdictions will also participate in “remote technical assistance and peer learning to guide implementation” (See Source 2).

For more information or an updated list, visit Source 1.

Are the factors and weights of the risk assessment publicly available?

Yes, the factors and weights are publicly available.

Does the risk assessment cost money for a jurisdiction to adopt?

No, the PSA is provided at no cost to jurisdictions.

Does the adoption of the risk assessment require training? If so, by who?

Arnold Ventures states that “A series of instructional guides and supporting resources are available to criminal justice professionals as they take steps to successfully incorporate the PSA into their pretrial systems.” (See Source 1)

In addition, Arnold Ventures strongly encourages that jurisdictions train their assessors, judges, and stakeholders on the PSA, prioritize fidelity to proper scoring, and establish a process for ongoing validations of the PSA.

Does the risk assessment come with any sort of software or software package?

The PSA’s full terms of use (including software usage) can be found on www.psapretrial.org.

Does the risk assessment involve or require an in-person interview?

The PSA does not require an in-person interview.

How does the risk assessment account for missing information?

According to Dr. Kristin Bechtel, “Jurisdictions who do not have access to the needed data to score the PSA will have to address this as a first step before implementing.” See the Readiness Guide on psapretrial.org to learn more.

Has the risk assessment been analyzed on non-training data for predictive validity? Has the risk assessment been analyzed with training data or non-training data with regard to performance for different race groups? Has the risk assessment been analyzed with training data or non-training data with regard to performance for different genders? If so, by who, when, and using what data?

Yes - researchers have published numerous evaluation and validation studies regarding the PSA and are continuing to evaluate (and possibly revise) the tool. Published results of research studies evaluating the PSA can be found at <https://www.psapretrial.org/about/research>

Information retrieved from:

- [1] www.psapretrial.org
- [2] PSA FAQs at <https://www.psapretrial.org/about/faqs>
- [3] Information from Dr. Kristin Bechtel of Arnold Ventures
- [4] LJAF Research Summary: Developing a National Model for Pretrial Risk Assessment dated November 2013
- [5] Information from Dr. Christopher Lowenkamp

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