RISK ASSESSMENT FACTSHEET
Correctional Offender Management Profiling for Alternative Sanctions (COMPAS)
Pretrial Release Risk Scale - II (PRRS-II)

LAST UPDATED: June 20, 2019
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Note: *The PRRS-II is a modified version of the PRRS-I that does not include age at assessment as a factor. This factsheet discusses the PRRS-II.*

Separately, according to Equivant, "The Northpointe, Inc. Research division designed a new Pretrial Assessment in 2018: the California Pretrial Assessment (CAPA). The CAPA was designed based on SB10 and is intended to serve the state of California's pretrial reform efforts. This new assessment utilizes a point scoring system which can be administered, scored and interpreted with ease, addressing the need for full transparency in the pretrial process.

The CAPA was constructed and automated for testing purposes, and the Northpointe Research division is currently finishing a validation study on the new assessment. The CAPA validation study is being completed using a dataset provided by a California jurisdiction interested in using a state-specific tool that is validated on a California-based population. Study results are expected to be compiled and published August, 2019. Once Northpointe Research has completed the study, the CAPA will replace the PRRS-II within the Northpointe Suite software application for California jurisdictions."

Once the CAPA is released and available, a new Factsheet will be prepared with information specific to the CAPA.

Who created the risk assessment?
The Pretrial Release Risk Scale (PRRS-II) was created by researchers at Northpointe, Inc. (now Equivant), a private company.

How large was the training data set?
The PRRS-II was developed using a sample of 2,831 felony defendants (Source 1).

How was the training data set collected and assembled (i.e., what jurisdiction(s) is it from)?
The training data came from a study in Kent County, Michigan. The data was selected from felony defendants who were assessed with the full COMPAS suite at pretrial and subsequently released. Most of the defendants had been released under supervision of pretrial services in Kent County, while the remainder of the data set was comprised of a random sampling (stratified by gender) of defendants who had been released (but not under supervision) in the relevant time frame. This random sample was drawn because of the "cost associated with manual searches" in Kent County's system to observe outcomes for defendants not released under supervision (Source 1).

Over what time frame was the data collected?

The data collected pertained to defendants who were assessed with the full COMPAS suite between January 2005 and December 2008 (Source 1).

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.
The information included the factors from the full COMPAS assessment, the Objective Point Scale (OPS) Kent County used to make bond recommendations for felony cases, dates pertaining to arrest and release, and outcomes (failure to appear (FTA) and new felony arrest) (Source 1).

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)?
No - the samples that were used contained defendants who had been released at some point in the observed pretrial process (Source 1).

Are there any known issues or errors with the data?
Criminal justice data sets, in general, often suffer from measurement error and sample bias. The researchers noted that, "As is the case in all pretrial release samples, the Kent County pretrial study sample is affected by selection mechanisms that determine which defendants are released and included in the estimation sample" (Source 1). They further note that "The results that we obtain in the study sample of felony defendants may not generalize to other settings or other types of pretrial defendant" (Source 1). In addition, one issue of note pertaining to measurement of outcomes is that "felony offenses committed by defendants in the unsupervised group may go undetected if they occur outside of Kent County" (Source 1). Beyond that, according to Equivant, there are no known issues or errors with the data used in the study.

In what year was the risk assessment created?
The risk assessment was created in 2009-2010.

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?
Using "subject matter knowledge," the researchers identified 38 variables in the full COMPAS assessment data as "potential candidates for model development" (Source 1). These variables pertained to criminal history, employment, education, housing, substance abuse and gang affiliation (Source 1).

How were factors that were considered ultimately chosen for exclusion or inclusion in the final model (the risk assessment itself)?
To construct the model after selecting the "candidate pool," the researchers took the following steps: "examine correlation structure and reduce the candidate pool by eliminating collinear candidate variables; examine nonlinear relationships and select variables using penalized (shrinkage) backward elimination; check the stability of the model selection procedure using bootstrap replications" (Source 1; see Source 1 for more information).

Does the final model include as a factor(s) arrests that did not lead to convictions?
Yes - the final model includes "number of times arrested/charges with a new crime while on pretrial release" (Source 3).

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?

Yes - the final model includes "history of drug abuse," "employment status" and "length of time in current community or neighborhood" (Source 1).

How were weights assigned to each factor included in the final model? (rounding correlation coefficients, Burgess Method, etc.)
The risk assessment "is a weighted linear combination of risk factors (regression equation) derived through survival analysis with shrinkage applied to the weights to compensate for how the risk scale will perform when applied to a different sample" (Source 1).

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?
"We define pretrial misconduct as failure to appear (FTA) or arrest for a new felony offense while on pretrial release" (Source 1).

What does the output of the model look like (i.e. a score on a scale of 1-10, etc.)?
According to Equivant, "The output of the PRRS II is a risk score (1-10) and a corresponding risk level (Low, Medium, High)" (Source 1).

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, the model outputs risk levels Low, Medium, and High. These risk levels were determined by transforming risk scores into deciles scores, analyzing the trends in probability of failure, and then cutting the deciles into groups. As a result, 50% of the cases fell into the medium risk level (Source 1). The Kent County report states that "When the Pretrial Release Risk Scale is deployed in a different jurisdiction, new deciles and cutting points should be set and tested" (Source 1).

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)?
See Source 1, page 45 for more detail on failure rates at each decile score.

Did the model developers assess the predictive validity of the model? If so, how (reported AUC, FPR, TPR, etc.)?
Yes - the model developers "evaluated the predictive accuracy of the Pretrial Release Risk Scale using Receiver Operating Characteristic (ROC) methods. We estimated the area under the ROC curve (AUC) in the training data and in the bootstrap samples to compensate for over-optimistic results obtained in the training data. The Pretrial Release Risk Scale achieved an apparent AUC of .711 in the training data and an AUC adjusted for over-optimism of .688. The model with age removed had somewhat lower predictive accuracy with an apparent AUC of .694 and adjusted AUC of .673" (Source 1).

Where is the risk assessment used?
According to Equivant, "two counties in California use the PRRS-II. Customer contracts include language that prohibits the dissemination of agency names" (Source 3). Also according to Equivant, "We cannot provide detailed jurisdiction information, per our customer license agreements."

Are the factors and weights of the risk assessment publicly available?
According to Equivant, "The PRRS-II factors are publicly available; the PRRS-II weights are available to licensed users and stakeholders. The new CAPA calculation is point driven and will be transparent to users, defendants, judges, attorneys, and other stakeholders."

Does the risk assessment cost money for a jurisdiction to adopt? Does the risk assessment come with any sort of software or software package?

According to Equivant, "Yes. It is accessible only through the purchase of a *Northpointe Suite* software license; however, there is no additional fee to use the PRRS-II once using the *Northpointe Suite*. The software provides multiple pretrial assessments for risk assessing, as well as pretrial supervision functionality. This allows an agency to track release/detain data and to manage ongoing community supervision needs if needed" (Source 3).

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

According to Equivant, "Yes, training is needed. Northpointe requires and provides training to its licensees. All assessments available to an agency require an implementation process that includes training. For a single pretrial assessment, the implementation process takes approximately 4-5 hours" (Source 3).

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

According to Equivant, "Two items require an interview: Employment status & How long have you been living at your current residence? Court records and case file information can be used to answer the other items" (Source 3).

How does the risk assessment account for missing information?

According to Equivant, "It doesn't" (Source 3).

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?

According to Equivant, "Outside of our internal development work, there have been no published studies on the performance of the PRRS-II that we are aware of."

Information retrieved from:

[1] Research and Development Departement, Northpointe, Inc. Kent County Pretrial Services Outcomes Study: Developing and Testing the COMPAS Pretrial Release Risk Scale (April 23, 2010).

[2] Equivant. Practitioner's Guide to COMPAS Core (April 4, 2019).

[3] Information about the CAPA and PRRS-II provided by Equivant (d/b/a Northpointe, Inc.) File attached.

[4] Email correspondences with Equivant, Inc.

Questions about the COMPAS pretrial risk assessment tool: PRRS-II.	
1	Are there any known issues or errors with the data?	No.
2	Where is the risk assessment used?	Two counties in California use the PRRS-II. Customer contracts include language that prohibits the dissemination of agency names.
3	Are the factors and weights of the risk assessment publicly available?	The PRRS-II factors are available, the weights are not. Please see attachment.
4	Does the risk assessment cost money for a jurisdiction to adopt?	Yes. It is accessible only through purchase of a *Northpointe Suite* software license; however, there is no additional fee to use the PRRS-II once using the *Northpointe Suite*. The software provides multiple pretrial assessments for risk assessing, as well as pretrial supervision functionality. This allows an agency to track release/detain data and to manage ongoing community supervision needs if needed.
5	Does the adoption of the risk assessment require training? If so, by who?	Yes, training is needed. Northpointe requires and provides training to its licensees. All assessments available to an agency require an implementation process that includes training. For a single pretrial assessment, the implementation process takes approximately 4-5 hours.
6	Does the risk assessment come with any sort of software or software package?	Yes; please see response to question 4.
7	Does the risk assessment involve or require an in-person interview?	Two items require an interview: Employment status & How long have you been living at your current residence? Court records and case file information can be used to answer the other items.
8	How does the risk assessment account for missing information?	It doesn't.

California Pretrial Reform: New Pretrial Assessment

The Northpointe, Inc. Research division designed a new Pretrial Assessment in 2018: the *California Pretrial Assessment* (*CAPA*). The CAPA was designed based on SB10 and is intended to serve the state of California's pretrial reform efforts. This new assessment utilizes a point scoring system which can be administered, scored and interpreted with ease, addressing the need for full transparency in the pretrial process.

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Documentation on the CAPA is included in the attached file along with documentation for the PRRS-II.

COMPAS Pretrial Scale Documentation

The Northpointe Suite is an automated decision-support software package of risk and needs assessments and case management tools that have been developed for specific decision points within the criminal justice system. These decision points include pretrial, supervision, and rehabilitative treatment planning.

Below is a description of the COMPAS Pretrial tools either currently available or soon to be available in the Northpointe Suite.

Pretrial Release Risk Scale (PRRS) II

Table 1 shows the items that enter the COMPAS Core Pretrial Release Scale II. A lasso survival model was fit to obtain regression weights for the variables.

Table 1: Model Elements and their corresponding descriptions for the PRRS II Raw Score model.

PRRS II Model Element	Description
a	Intercept (constant)
w_i	Coefficient (weight) for ith variable
n.pending	Number of pending charges or holds
crime.category	Which offense category represents the most serious current offense
n.jail	Number of times sentenced to jail for more than 30 days
n.fta	Number of times failed to appear for scheduled court hearing
n.arrest.on.bail	Number of times arrested/charged with a new crime while on pretrial release
drug.hx	History of drug abuse (dichotomous variable)
month.local	Length of time in current community or neighborhood
have.employment.school	Employment Status (Full Time; Part Time; Unemployed; Not in labor force)

Equation **??** calculates the raw score for the PRRS II. Cut points are used to convert raw scores to decile scores. Decile scores are then collapsed into risk levels or text scores: Low, Medium, High.

$$\texttt{PRRS II Raw Score} = a + w_1 \times \texttt{n.pending}$$
$$+ w_2 \times \texttt{crime.category}$$
$$+ w_3 \times \texttt{n.jail}$$
$$+ w_4 \times \texttt{n.fta}$$
$$+ w_5 \times \texttt{n.arrest.on.bail}$$
$$+ w_6 \times \texttt{drug.hx}$$
$$+ w_7 \times \texttt{month.local}$$
$$+ w_8 \times \texttt{have.employment.school}$$

California Pretrial Assessment (CAPA)

The CAPA is a 7-item Test Instrument that is SB10 compliant. It is a modified version of the 8-item PRRS II. Table 2 depicts the items used in calculating a CAPA raw score. The CAPA is a summative scale. There are no weights or an intercept term.

Table 2: CAPA Scale items & corresponding descriptions.

Item	Description
n.pending	Number of pending charges or holds
larceny	Top charge is a felony property or fraud offense
n.jail	Number of times sentenced to jail 30 days or more
n.fta	Number of times failed to appear for scheduled court hearing
any.arrest.on.bail	Arrested/charged with a new crime that resulted in conviction while on pretrial release
drug.hx	History of drug abuse (dichotomous variable)
probpar	On probation or parole at time of current offense