OYA Recidivism Risk Assessment

Modeling Risk to Recidivate

Abstract

The primary goal of this study was to identify the factors most closely associated with felony recidivism and to quantify the relationship of those factors into an equation that would accurately predict a youth's risk to recidivate. The study population comprised youth placed on county probation, youth committed to Oregon Youth Authority (OYA) probation supervision, and youth released to the community from OYA close custody facilities. Data included demographics and numerous criminal and delinquency history variables for each youth. Using bootstrap resampling and stepwise logistic regression, analysts determined which of the potential variables were statistically significant in predicting recidivism. The final model was refined to 12 independent predictors of recidivism and 3 interaction terms; it performed moderately well (AUC = .72) in predicting whether a youth would recidivate within 36 months. Five of the 12 variables in the final model reflected prior criminal/delinquent activity, and 3 of the predictor variables had no criminal component. Sex offense was the only independent variable in the equation that was a negative predictor of recidivism. While ORRA results will be helpful in making supervision and treatment decisions for individual youth, it has other important and practical applications. In particular, ORRA scores will be a valuable asset in program evaluations that can benefit from a matched sample design methodology.

Overview

> *The mission of the Oregon Youth Authority is to protect the public and reduce crime by holding youth offenders accountable and providing opportunities for reformation in safe environments.*

As the state's juvenile corrections agency, the Oregon Youth Authority (OYA) is responsible for youth who cannot safely live in the community and provides supervision and treatment opportunities to youth offenders throughout Oregon. Recidivism—relapsing into criminal behavior—is the key measure of the extent to which OYA services have been able to protect the public. While there are many ways to specify recidivism, OYA's standard measure is a felony conviction or adjudication within 36 months of commitment to OYA probation or release from OYA close custody.

For this study, research staff from OYA and the Oregon Department of Corrections (DOC) combined their resources to examine whether they could identify a common set of risk factors for predicting recidivism of youth offenders supervised by either OYA or county juvenile departments. Leveraging the tools and knowledge DOC gained from a previous similar effort focused on adult offenders (DOC, 2008), the analysts were successful in building an equation that provides a useful and accurate assessment of a youth's risk of reoffending. Hence, the OYA Recidivism Risk Assessment (ORRA)—the risk equation discussed in this report—represents another step in the evolution of the agency's ability to assess a youth's likelihood of recidivism.

ORRA relies solely on data collected as part of current standard practice on all youth with records in Oregon's statewide Juvenile Justice Information System (JJIS). Consequently, the agency will be able to employ the improved measure almost immediately. In fact, JJIS developers have already prototyped the equation in code. Soon the system will be able to automatically generate a recidivism risk score for youth in any of the following population groups:

- Juveniles placed on county probation
- Juveniles committed to OYA probation
- Juveniles released from OYA close custody
- DOC youth released to post-prison supervision (PPS) from OYA close custody

ORRA will not be the only juvenile risk assessment available to juvenile justice agencies in Oregon. At present, there are two key risk assessment tools already in use: the OYA Risk/Needs Pre-Screen assessment (RNA) and the Juvenile Crime Prevention risk assessment (JCP). OYA currently assesses risk on all youth in its custody with the RNA. The RNA, however, is less relevant for first-time offenders who are more likely to be seen by county juvenile departments. All Oregon counties use the JCP to evaluate youth assigned to a juvenile department counselor for case management. Unfortunately, the risk classifications between the RNA and JCP instruments are not interchangeable. In fact, the absence of a single tool appropriate to all youth in the system was one of the key factors driving ORRA development.

Unlike the RNA- and JCP-based risk measures—which classify youth as low, moderate, or high risk of recidivating—the ORRA equation produces a single numeric result between 0 and 100. A result near zero indicates the youth is very unlikely to recidivate with a felony inside 36 months, while a number near 100 identifies the youth as highly likely to recidivate.

From the outset, the primary goal of the project has been to identify the factors most closely associated with recidivism and to quantify the relationship of those factors into an equation to assess a youth's risk to recidivate. ORRA achieves this. Armed with such a tool, analysts will be in a position to evaluate the effectiveness of many OYA treatment programs using a matched sample research design methodology. Such evaluations will provide critical input to agency discussions and decisions around selecting treatment programs, improving program implementation, and identifying the youth most likely to benefit from specific services.

As a practical matter, ORRA results are likely to have a role in other agency decisions. For example, facing perhaps years of tightly constrained or even constricting budgets, OYA must carefully weigh how to best achieve its mission through the prudent allocation of scarce resources to youth in the agency's care. The ORRA measure will assist the Director and other agency managers in making decisions that minimize current and future public risk by identifying appropriate supervision levels, service dosage, and placement for each youth committed to OYA custody.

Furthermore, in keeping with OYA's practice of placing youth in the least restrictive environment in which they can achieve their treatment goals, the agency can reserve the most intensive—and most costly—supervision for offenders at the highest risk levels and most severe crimes.

Purpose

The agency's commitment to reducing juvenile crime and further victimization overarches every decision about a youth's level of supervision, placement, reformation plan, and transition services. The goal of this study was to create a functional model for assessing a youth's risk to recidivate. Such a model can play an important role not only in making supervision and treatment decisions for individual youth but also in facilitating research into the effectiveness of program offerings for youth offenders.

Methodology

Subjects

The original data extract comprised 28,431 disposition records representing 19,309 unique youth. Records provided data on youth demographics, disposition detail for the current

record, and criminal history variables for dispositions meeting at least one of the following qualifying event criteria between January 1, 2005 and May 14, 2010:

1. **Placement on county probation.** The disposition date was the same as the qualifying event date (placement).
2. **Commitment to OYA probation.** The disposition date was the same as the qualifying event date (commitment).
3. **Release from an OYA close custody facility.** Most of these youth received a period of OYA parole supervision, but some were released with no further supervision due to an expired or terminated commitment. The disposition committing the youth to OYA close custody occurred prior to the qualifying event (release).
4. **Release from OYA close custody to supervision in the adult system.** These youth were placed in the physical custody of OYA after being sentenced as adults and committed to the legal custody of DOC. The youth's admission to OYA close custody occurred prior to the qualifying event (release).

In the original data, the disparity between total disposition records and unique youth resulted from youth with either multiple probation dispositions or OYA close custody releases during the event time frame. The disposition records remaining in the final dataset used for analysis contained no duplicate youth. The following paragraphs detail how this was accomplished.

Initially, analysts winnowed the original dataset down to a group of qualified dispositions using the following process:

1. **Omitted disposition records of youth supervised under interstate compact.** Because these youth did not commit their crimes in Oregon, information about their criminal histories was incomplete or unknown.
2. **Omitted disposition records of youth who were returned to DOC to complete their sentences in adult institutions.** Analysts excluded these youth because they had little opportunity to recidivate while still incarcerated at DOC.
3. **Omitted disposition records of youth committed to OYA probation or placed on county probation who were subsequently committed to an OYA youth correctional facility (YCF) without recidivating.** Two examples of when this could have happened were (a) a judge upgraded a youth's disposition from a suspended OYA YCF commitment to an actual commitment to an OYA YCF, or (b) a youth received probation but had prior outstanding charges that later resulted in commitment to an OYA YCF. Analysts excluded these youth because they had little opportunity to recidivate while under close custody supervision.

Analysts then narrowed the set of all qualifying dispositions into the final dataset of 15,986 records, which contained only one qualified disposition for each youth. All qualifying disposition records for unique youth were automatically included in the dataset. Where youth had multiple qualifying dispositions, one randomly selected record per youth was retained in the final dataset for analysis.

Outcome variable: recidivism

Recidivism may be broadly defined as a relapse into criminal behavior. However, to create a functional risk model requires a consistent and unambiguous measure of recidivism. This can be accomplished by clearly specifying the four components that define recidivism: (a) group of people to track, (b) date to start tracking, (c) length of time to track, and (d) recidivism event. This study specified the four recidivism components as follows:

Group of people to track. The potential predictors of recidivism were examined on four key populations:

- *County probation:* youth offenders who were placed on probation under the supervision of the county juvenile department.
- *OYA probation:* youth offenders who were committed to OYA probation and placed in the legal and physical custody of OYA for a period of out-of-home care and supervision.
- *Juveniles released from OYA close custody:* juvenile offenders who were released to the community from OYA close custody. Nearly all of these youth experienced a period of parole supervision, but a few cases each year may be terminated, typically due to an expired commitment or aging out of the system. (OYA supervision is limited to youth under age 25.)
- *DOC youth released from OYA close custody:* youth offenders who were convicted as adults and then later released to post-prison supervision from OYA close custody. In the legal custody of DOC, these youth were placed in the physical custody of OYA at a youth correctional facility. (Note: OYA does not track recidivism of DOC youth who are returned to the physical custody of DOC and released from DOC close custody at a later date.)

Date to start tracking. The date to start tracking recidivism differed for each of the key populations:

- *County probation:* date each youth was placed on county probation.
- *OYA probation:* date each youth was committed to OYA probation.
- *Juveniles released from OYA close custody:* date each youth was released to the community from OYA close custody.
- *DOC youth released from OYA close custody:* date each youth was released to DOC post-prison supervision from OYA close custody.

Length of time to track. This study tracked each youth for 12, 24, 36, and 48 months.

Recidivism event. Any felony adjudication (juvenile court) or felony conviction (adult court) with a disposition of formal supervision (e.g., probation, OYA commitment, DOC prison sentence, or local control jail sentence).

Independent variables

OYA provided the research team with youth disposition records extracted from JJIS, including basic demographic information, age at first delinquency, details of the disposition related to the current record, and numerous summary fields describing the youth's disposition history.

Variables related to the current disposition included information about the disposition date, disposition intensity, and crime detail.

Variables related to the youth's history summarized delinquent activity occurring prior to the disposition date of the current record. While not necessarily intuitive, referral[1] data associated with the current disposition record were included in the summary variables. This was appropriate because a youth must have been referred before the court entered a disposition on the referral.

A list of the entire set of potential predictor variables is available in the Appendix.

Building the model

SAS statistical software provided the analytical engine for developing the risk model. The key analytical techniques employed in deriving the recidivism risk equation included bootstrap resampling[2], logistic regressions, and concordance and area under the receiver operating characteristic curve metrics.

There were four main phases in the model building process: Phase I—initial selection and definition of variables; Phase II—screening variables; Phase III—creating the models; and Phase IV—selecting and refining the final model.

Phase I—initial selection and definition of variables. In the first phase, analysts examined the complete set of potential predictor variables (see Appendix) by creating frequency distributions of the values for each variable. Variables with little or no variation have no predictive value and were eliminated from further analysis. For example, 99.96% of the disposition records had no prior robbery referrals, so analysts excluded the variable from the next phase.

Also part of Phase I was the creation of composite variables. The values of multiple separate but related variables were accumulated into new composite variables to increase the potential predictive value of the new variables. For example, theft and substance use are often identified as predictors of recidivism. So, analysts created composite predictor variables to represent these risks: total prior theft referrals and total prior drug or alcohol referrals (Table 1).

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[1] A referral is an allegation or group of allegations received by a juvenile department at any one time. Referrals are documented by a police report or other formal means of referral. A referral in the juvenile system is similar to an arrest or citation in the adult system.

[2] A bootstrap resampling procedure takes repeated random samples from the dataset with replacement, meaning that records drawn in one sample are replaced in the dataset before the next sample is drawn. Hence, individual records may be redrawn in subsequent random samples.

As a final step in Phase I, analysts determined whether value ranges were appropriate for each of the variables that were to be promoted to the variable screening phase. Value ranges were modified for only a few variables, primarily by collapsing values with lower frequencies into a single value. For example, the total prior felony referrals variable was defined to have a maximum value of 6. In the original dataset, the value range for this variable was 0 to 25. However, relatively few youth had more than 6 felony referral counts, so 6 or more referrals were tabulated as 6.

Table 1: Composite Variables

COMPOSITE VARIABLE NAME	COMPONENT VARIABLES
Total prior drug or alcohol referrals	Total number of prior referrals: drugs or alcohol (felony) + drugs or alcohol (misdemeanor) + alcohol/minor in possession (violations) + less than an ounce of marijuana (violation) + drugs or alcohol (violation)
Total prior theft referrals	Total number of prior referrals: theft (felony) + theft (misdemeanor) + theft (violation)

Analysts retained 37 potential predictor variables from Phase I for the next phase of model building.

Phase II—screening and ranking variables. In Phase II, analysts used bootstrap resampling and stepwise logistic regression to determine which of the 37 potential predictor variables forwarded from Phase I were statistically significant predictors of recidivism.

Table 2: Sample Sizes for Bootstrap Process

TRACKING PERIOD	AVAILABLE RECORDS	SAMPLE SIZE
12 months	16,005	10,000
24 months	12,693	8,000
36 months	9,257	6,000
48 months	5,794	3,800

The resampling process consisted of drawing repeated random samples, with each sample representing approximately two-thirds of the available records at each tracking period. As Table 2 shows, the number of available records dropped as the length of the tracking period increased. In all, analysts drew a total of 4,000 random samples: 1,000 samples for each of the four recidivism tracking periods.

The following steps describe the basic process for screening and ranking the predictor variables:

1. To identify which variables were significant in predicting recidivism, stepwise logistic regressions incorporating all of the potential predictor variables were run with each of the 1,000 samples selected for that particular tracking period.
2. Using the results from the 1,000 logistic regression simulations, potential predictor variables were tabulated and ranked to determine which ones consistently revealed the strongest relationships with recidivism.
3. Steps one and two were repeated for the 12-, 24-, 36-, and 48-month recidivism tracking periods.

Phase III—creating the models. Analysts began with the top 30 percent of the ranked predictor variables from Phase II to build four candidate models—one at each tracking

period—to predict recidivism for the full dataset population. Each of the predictor variables was entered into a logistic regression equation and examined to determine its unique effect on recidivism (i.e., the effect of the individual variable after controlling for the effect of all other predictor variables). Predictor variables with a statistically significant effect on recidivism that also increased the concordance rate[3] were retained in the models[4].

The next step was to test the four models for group differences. Here, *group* refers to the four key populations described above under the Subjects subsection. Tests revealed no significant group differences (p > .50 in all tests). This meant the identical risk equation could be developed and applied to all four groups: county probation, OYA probation, juveniles released from OYA close custody, and DOC youth released from OYA close custody. In addition, a plot of the distribution of ORRA scores by group further illustrated that the key populations did not differ (Figure 1).

Phase IV—selecting and refining the final model. Of the four candidate models, the preliminary predictive model for 36-month recidivism attained the highest concordance rate of .73, which was sufficient for further analysis. This preliminary model consisted of 19 terms: 12 independent predictor variables, 6 interaction variables, and a constant. Note that selecting the 36-month tracking period effectively reduced the dataset to 9,257 records by eliminating youth whose event date was later than May 14, 2007.

As a final step in refining the risk model, analysts tested the contribution of the interaction terms[5] and found they could still reach the .73 concordance rate after removing 3 of the interactions from the equation. Hence, the refined risk assessment equation, which predicted 36-month recidivism for the full dataset population, included 16 terms comprising 12 independent predictor variables, 3 interaction terms, and a constant.

The refined risk assessment equation resulting from this phase is the final OYA Recidivism Risk Assessment (ORRA).

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[3] The concordance rate is one measure of a model's predictive accuracy. It indicates the presence of a given trait in both members of a pair of twins. So, in the case of the ORRA model, the concordance rate was the percentage of cases where youth with similar ORRA scores had the same recidivism outcome.

[4] Following this procedure yields an equation that minimizes the number of predictor variables. Called parsimony, there is a general preference among statisticians for models that provide the least complex explanation of an outcome.

[5] An interaction term is a composite of two or more predictor variables whose effect on the outcome will vary depending on the level of the other variables in the term. The interaction term adjusts the outcome for these dependencies. Essentially, if one individual possesses two traits or characteristics included in the interaction term, risk will increase or decrease if the interaction term is significant.

Figure 1: Distribution of ORRA Scores by Group
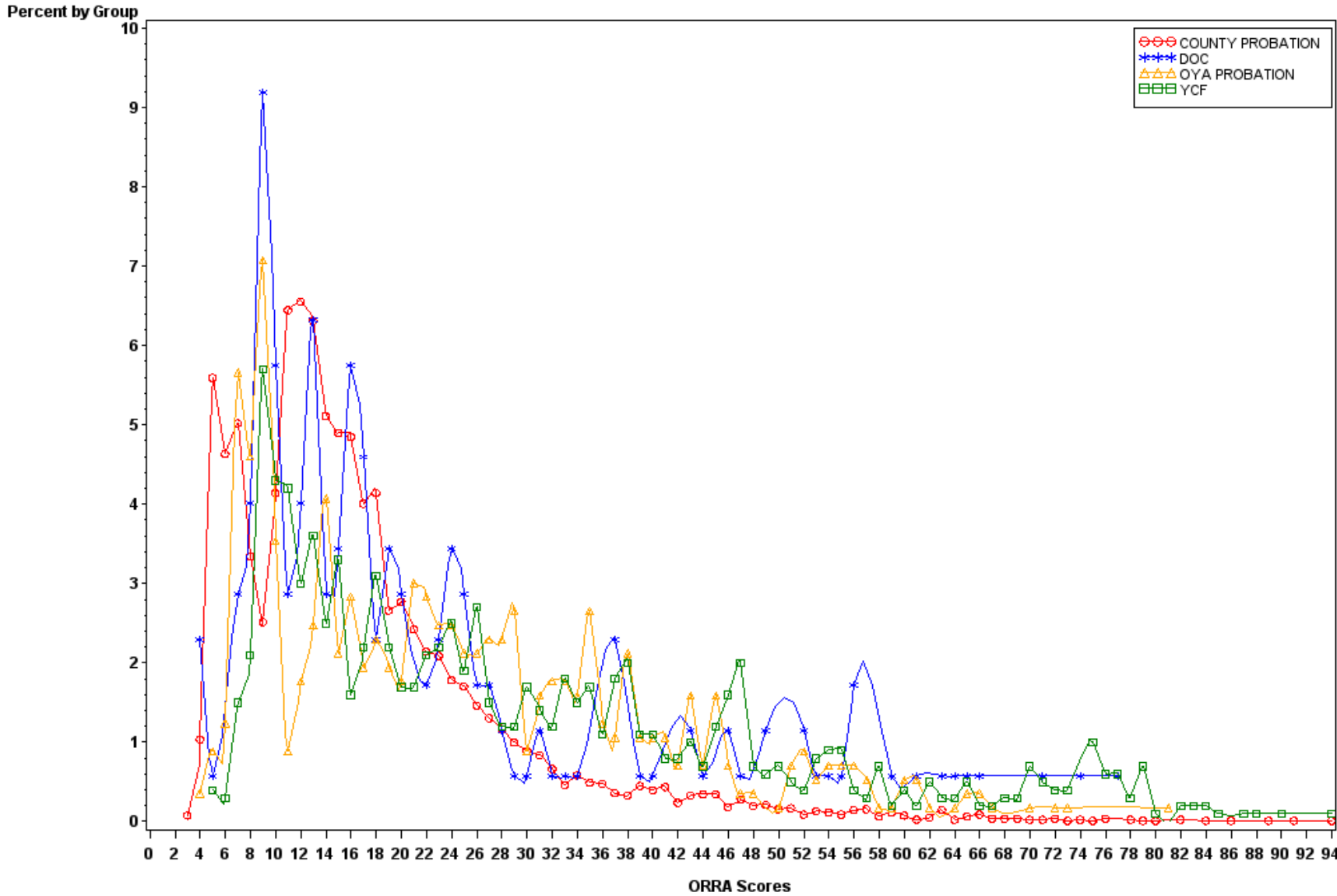
Results

Model accuracy

Area under the curve (AUC) metrics were calculated to measure the model's accuracy, that is, how well ORRA correctly classified those who did and did not recidivate.[6] On a random sample of 4,623 cases with known outcomes, the final risk equation achieved AUC = .72. An AUC = .50 suggests an equation's predictive accuracy is poor, while an AUC = 1.0 represents a perfect test[7]. Therefore, the score on the ORRA model indicated that the new instrument performed moderately well (Tape, n.d.).

The overall 36-month recidivism rate for the study dataset was 18.52%. Despite differences in population recidivism rates (Table 3), the final ORRA model was equally applicable to all populations. The differences among recidivism rates of the key populations reflected differences in the predictor variables among the populations.

Table 3: Population Recidivism Rates

POPULATION GROUP	N	RECIDIVISM RATE
Entire study population	9,257	18.52%
County probation	7,517	16.64%
OYA probation	565	24.25%
Juveniles released from OYA close custody	1,001	28.57%
DOC youth released from OYA close custody	174	22.99%

Predictors of recidivism

The analysis identified 12 independent predictors of recidivism. In addition, the final ORRA equation included 3 interaction variables and the intercept term. Refer to Table 4 for a complete list of the final equation components.

Predictor variables retained in the final equation were all static risk factors that could be described by one or more of the following: demographic (e.g., sex and age at start tracking), crime severity (e.g., felony or misdemeanor), crime/delinquency type (e.g., theft, weapon, running away from home), or frequency of occurrence. Six of the final equation variables were found to have a highly significant relationship ($p < .0001$)[8] with risk to recidivate: prior criminal mischief referral, total prior misdemeanor referrals, current sex offense disposition, total prior runaway referrals, total prior felony referrals, and male. One of the independent variables—total prior theft referrals—did not meet this study's standard for significance ($p < .05$) but was included the equation because its interaction effect with the prior criminal mischief referral variable was significant.

All but one of the independent predictor variables were positively associated with risk, meaning that the presence of these attributes increased the likelihood that youth recidivated. The only independent predictor variable that reduced the odds of recidivating

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[6] The AUC metric indicates the probability that a randomly selected youth from a group that recidivated will have a higher risk score than a randomly selected youth from a group that did not recidivate.

[7] An AUC = 1.0 would suggest the equation correctly differentiates recidivists and non-recidivists.

[8] A result is considered statistically significant if it is unlikely to have occurred by chance. The $p < .0001$ level of statistical significance means there is less than one chance in 10,000 that the result happened by coincidence.

was a current sex offense disposition.[9] In addition to the sex offense variable, two of the interaction terms were negatively correlated with risk to recidivate.

Except for sex offense, none of the predictor variables specified a person crime. That said, a history of person crimes would be captured in a general way in the prior delinquency adjudication and total prior referrals predictor variables.

Table 4: OYA Recidivism Risk Assessment Predictor Variables

PREDICTOR VARIABLES	VALUES	PARAMETER ESTIMATE (β)	ODDS RATIO	SIGNIFICANCE LEVEL
Intercept	Constant	-3.9390	N/A	<.0001
Prior felony drug or alcohol referral	No = 0, Yes = 1	0.2271	1.255	0.0141
Prior weapon offense referral	No = 0, Yes = 1	0.1921	1.212	0.0203
Age at start tracking	Age at probation start or release to community from close custody	0.0450	1.046	0.0136
Prior criminal mischief referral	No = 0, Yes = 1	0.6054	1.832	<.0001
Total prior misdemeanor referrals	Sum (maximum = 20)	0.0985	1.103	<.0001
Total prior theft referrals	Sum (no maximum)	0.0509	1.052	0.0971
Prior delinquency adjudication	No = 0, Yes = 1	0.1954	1.216	0.0037
Total prior drug or alcohol referrals	Sum (no maximum)	0.1048	1.111	0.0002
Current sex offense disposition	No = 0, Yes = 1	-0.5025	0.605	<.0001
Total prior runaway referrals	Sum (maximum = 20)	0.1082	1.114	<.0001
Total prior felony referrals	Sum (maximum = 6)	0.1859	1.204	<.0001
Male	Female = 0, Male = 1	0.9663	2.628	<.0001
Interaction: prior criminal mischief referral & total prior misdemeanor referrals	Product of the two variable terms specified	-0.1090	0.897	<.0001
Interaction: prior criminal mischief referral & total prior theft referrals	Product of the two variable terms specified	0.1023	1.108	0.0303
Interaction: prior criminal mischief referral & total prior runaway referrals	Product of the two variable terms specified	-0.0673	0.935	0.0159

* Variables that refer to prior history reflect activity prior to the disposition date on the current disposition record.

Understanding odds ratios

Each parameter estimate in Table 4 is the unconverted coefficient for the associated predictor variable in the logistic regression equation. Substituting the parameter estimate for x in the exponential function (e^x) converts it into an odds ratio, which is simpler to interpret. An odds ratio of 1.0 would mean that—all else being equal—a difference in the

[9] Note in Table 4 that the parameter estimate for the sex offense variable is negative and its odds ratio is less than 1.0, whereas the parameter estimates are positive and the odds ratios are greater than 1.0 for the other independent predictors. A variable with a negative parameter estimate indicates that presence of the attribute reduces the risk of recidivating.

value of the predictor variable would have no impact on the likelihood of recidivating. The more a variable's odds ratio differs from 1.0, the greater its influence is on predicted recidivism for each increment in the variable's value.

Following are some examples based on the odds ratios of a few of the predictor variables listed in Table 4:

1. The odds ratio associated with being male is 2.628. So, if two youth are identical in every way except sex, then the odds that the male will recidivate are 2.628 times that of the female.
2. All else being equal, the odds that a youth with one prior runaway referral will recidivate in 36 months are 1.114 times greater than a youth with no such referrals. Similarly, the odds of recidivating for a youth with two runaway referrals are 1.114 times greater than a youth with one runaway referral. By extension, the odds that a youth with two prior runaway referrals will recidivate are 1.241 ($1.114^2 = 1.241$) times greater than a youth with no such referrals. Note that the value for this variable is capped at 20. Therefore, if two youth are identical except for runaways, then the tool will estimate the same risk of recidivism for a youth with 23 prior runaway referrals and a youth with 20 prior runaway referrals.
3. A prior referral for a felony increases a youth's odds of recidivating by 1.204. Subtracting 1.0 from the odds ratio leaves 0.204. Multiplying this figure by 100 converts it to the marginal percentage increase in the odds of recidivating for each additional prior felony referral. In other words, an additional prior felony referral increases a youth's odds of recidivating by 20.4%. The maximum value for this variable is 6, so the maximum effect of this variable on a youth's odds of recidivating is 3.046 ($1.204^6 = 3.046$). Therefore, the odds that a youth with six or more prior felony referrals will recidivate are 3 times greater than a youth with no such priors, presuming the two youth are otherwise identical in their risk factors.

The foregoing examples help demonstrate the interaction between the odds ratio associated with a predictor variable and the value of the predictor variable. Also notable is that a variable with a relatively small odds ratio may have a substantial impact on predicted recidivism if the variable accepts a wide range of values. As a case in point, compare the effect of the odds ratios in the first and third examples above. The first example shows that the odds ratio associated with being male is 2.268, which represents the maximum effect of sex on recidivism because the predictor variable can accept only two values (0 = female, 1 = male). In the third example, the odds ratio for the prior felony referrals predictor variable is 1.204, much smaller than the odds ratio associated with being male. However, six prior felony referrals boosts the odds of recidivating threefold, which is a greater effect than being a male (odds for six prior felony referrals = 3.046 vs. odds for males = 2.268).

Interpreting ORRA scores

As described above, the component terms of the ORRA equation are those variables and interactions discovered to have a significant influence on recidivism in the target population. However, it is the equation's result—the ORRA score—that provides the overall assessment of a youth's risk to recidivate.

The final ORRA model is represented by a logistic regression equation. The result of a logistic regression is a decimal number between 0 and 1 that represents the probability of an event. In this study, the outcome event is recidivism. An ORRA score is obtained by multiplying the result of the logistic regression by 100 and rounding that answer to the nearest whole number. Hence, an ORRA score near zero means the youth has been assessed as a low risk of recidivating. Conversely, a score near 100 indicates a high likelihood of recidivating.

So, for example, an ORRA score of 20 indicates that the likelihood a youth will recidivate is approximately 20 percent. In other words, based on knowledge of the relevant explanatory variables, 20 out of 100 youth with these risk factors are predicted to recidivate within 36 months. Furthermore, a youth with an ORRA score of 60 has a higher probability of recidivating than a youth with an ORRA score of 20.

Again, the ORRA score is an assessment of risk, not a certainty. The outcome variable—recidivism—is dichotomous. There is no such thing as partial recidivism: either the youth recidivates or the youth does not. By extension, an ORRA score of 60 does not mean the youth will definitely recidivate. While 60 of 100 youth with an ORRA score of 60 would be expected to recidivate, 40 of 100 youth with this score would not be expected to recidivate.

Discussion

Summary of key findings

While ORRA results will be helpful in making decisions for individual youth, it has other important and practical applications in the area of program evaluation. In particular, ORRA scores will be a valuable data asset in evaluations that can benefit from a matched sample design methodology.

Predictor variables. There were no real surprises in the list of variables retained in the final recidivism risk equation. As pointed out in the Results section, none of the predictors listed in Table 4—save current sex offense disposition—references person crimes specifically.

That sex offense is a negative predictor variable in the ORRA model corroborates prior OYA studies, which have found that sex offenders recidivate at a lower rate than non-sex offenders. This has been true at the 36-month tracking period for both the OYA parole and OYA probation populations at least as far back as 2001 (OYA, 2009a).

Consistent with the notion that past behavior is perhaps the best predictor of future behavior, 5 of the 12 variables in the model reflect frequency of prior criminal/delinquent activity: total prior misdemeanor referrals, total prior theft referrals, total prior drug or alcohol referrals, total prior runaway referrals, and total prior felony referrals.

Three of the predictor variables have no criminal component: male, age at start tracking, and total prior runaway referrals. None of these are unusual, however. Age, sex, and runaway variables are common to many risk assessments, including the Washington State

Juvenile Court Assessment (WSJCA) (Barnoski, 2004) and assessments adapted from the WSJCA, such as the agency's own RNA and Florida's Positive Achievement Change Tool (PACT) (Baglivio, 2009). A notable difference may be that the ORRA equation's age variable is age at start tracking, while the RNA includes age at first delinquency. Age at first delinquency was one of the potential predictor variables examined in the model development, appearing as a significant predictor in 27.7% of the 1,000 simulations for 36-month recidivism. However, only one age variable—age at start tracking—remained in the equation as a significant predictor. Also mentioned in the Results section, the male variable was found to have a strong statistically significant relationship with recidivism. The agency commonly reports recidivism rates by sex, and males typically post higher rates than females (OYA, 2009a). While not surprised at its inclusion in the model, analysts on this study were somewhat intrigued with the strength of the runaway variable. Runaway is commonly associated with family issues such as substance abuse, psychological problems, and economic factors.

Predictive accuracy. ORRA's AUC = .72 suggests the model has moderate predictive accuracy. A number of studies have tested the validity of juvenile risk assessment instruments using AUC as the effect size measure (e.g., Bechtel, Lowenkamp, & Latessa, 2007; Jung & Rawana, 1999; Schwalbe, Fraser, & Day, 2007). In a meta-analysis of 28 juvenile risk assessment studies, Schwalbe (2007) reported AUCs between .532 and .780 across all studies, with a weighted average effect size of AUC = .640, *SD* = .042.

The relatively high AUC statistic achieved with the ORRA model could be attributable to (a) reliable independent variables (e.g., variables based on quantitative data, not subjective assessment), (b) the use of actual weights rather than approximated weights that are common with pencil-and-paper types of assessments, and (c) the inclusion of statistical interactions among independent variables. These statistical interactions imply that combinations of factors are important when assessing risk to recidivate.

Strengths and limitations

Dataset and methodology. This project benefitted from a dataset that included numerous potential explanatory variables and from the use of bootstrap resampling techniques that capitalized on the large number of available records—9,257 commitments in the final cleansed dataset for the 36-month tracking period. Furthermore, analysts were able to construct the ORRA model from objective variables that had been collected for a number of years through the course of standard business practices. The advantage of this methodology and a sound dataset was the ability to create a parsimonious model incorporating covariates that had demonstrated a significant relationship with recidivism.

A clear benefit to the study was the availability of longitudinal recidivism data for the youth population. However, there were some limitations regarding the currency of available data on youth whose supervision had been terminated. In particular, data were not available to update records of terminated youth with felonies convicted outside of the Oregon judicial system (e.g., convictions in another state or the federal system) or to flag the records for censoring in the case of death.

Static risk factors. A potential limitation of the ORRA model is its reliance on static risk factors—delinquency history variables, age at start tracking, and sex—known at the time of the youth's disposition (e.g., commitment to probation or to OYA close custody). Variables such as attitude, peer associations, family problems, and substance dependency are considered dynamic factors and are frequently targeted for change with interventions post-disposition. In addition to the agency's RNA instrument, many of the risk assessments in use today—e.g., WSJCA (Barnoski, 2004), PACT (Baglivio, 2009) and Youth Level of Service Inventory/Case Management Inventory (Bechtel, Lowenkamp, & Latessa, 2007)—depend on some combination of both static and dynamic factors.

While the ORRA equation does not account specifically for dynamic factors, these effects have been indirectly incorporated into the model because the opportunity for change in the dynamic variables was available to youth in the sample used in constructing and validating the tool. However, the relationship between the independent static variables and recidivism quantified in the ORRA model may change in time. It is, after all, the business of this agency to reform youth identified as high risk of recidivating so that they can go on to lead productive, crime-free lives. To the degree that the agency—or any partner in the youth's reformation—is consistently able to improve its targeting and delivery of treatment services, the influence of certain static risk factors may be mitigated in the face of change in dynamic variables, which are not quantified in the model.

Fixed tracking period. Another limitation of the ORRA model is that it makes no adjustment to the tracking period to compensate for days lost to revocation, detention, or re-incarceration in an adult system facility. Consequently, some youth may be under intensive supervision—with little opportunity to recidivate—during the recidivism tracking period. To quantify one example, of the 377 youth released to OYA parole supervision in fiscal year 2008 (July 1, 2007 to June 30, 2008), 120 were revoked to OYA close custody within 12 months.

Application of ORRA scores

Program evaluation. The gold standard for program evaluation is random assignment, a methodology that would randomly assign youth either to receive or not to receive a treatment intervention. In practice, this standard is nearly impossible for OYA to reach because all youth committed to the agency receive treatment designed to reduce future criminal activity by addressing their particular needs and criminogenic risks. For example, every youth with a diagnosed drug or alcohol problem will receive substance abuse treatment. Treatment is not withheld for the sake of research. Unfortunately, treating all youth means researchers have no comparison group for the program evaluation.

While the agency may have implemented a treatment program because prior studies conducted on non-OYA youth found it to be effective, questions remain, such as whether the program is effective for OYA youth. For this type of evaluation, rigorous research design demands a control group of untreated youth.

In lieu of random assignment, OYA researchers can employ a quasi-experimental research methodology that relies on matching each treated youth with a similar untreated youth and then examining differences in their outcomes. Key matching variables comprise

demographics, crime type, and risk to recidivate. Along with identifying a contingent of non-treated youth, the risk variable has always posed a thorny problem. The RNA-based risk tool categorizes youth into three broad categories. ORRA provides a finer-grained score so that youth may be more precisely matched. Equally important, ORRA enables researchers to match treatment youth to untreated youth within or between any of these four populations:

- Juveniles placed on county probation,
- Juveniles committed to OYA probation,
- Juveniles released from OYA close custody, and
- DOC youth released to post-prison supervision from OYA close custody

The ability to match youth between the populations specified above comes from a finding that each of those four populations has a very similar risk distribution (Figure 1). As a consequence, researchers can employ the identical equation to assess risk among youth in all of these groups. Because youth outside the boundaries of the population under study are unlikely to have received the same treatment, ORRA vastly increases opportunities for matching treated youth with non-treated youth. Thus, conducting evaluations on the effectiveness of OYA treatment programs becomes far more feasible after ORRA implementation.

Resource allocation. As the Oregon economy struggles to recover, government agencies are faced with record deficits in the current and coming biennia. In this environment, agency services must be not only effective but *cost*-effective.

Findings from program evaluations that employ ORRA scores as part of the methodology will assist the agency in refining its catalog of treatment services to meet the profile of youth in OYA care.

The agency can also use ORRA scores to assist in determining the best placement for a youth. Youth at lower risk of recidivating can benefit from the provision of treatment programs in less restrictive—typically less costly—settings. This aligns well with OYA's current practice of placing adjudicated juveniles in the least restrictive environment possible in which they can achieve their treatment goals (OYA, 2009b).

Youth at higher risk of recidivating may also be candidates for higher treatment dosages, while lower-risk youth may see improvement more quickly. Studies have shown that interventions have greater effects on higher risk youth. For example, Lipsey and Wilson's (1998) meta-analysis found that the typical intervention in the studies they analyzed "was *more* effective with serious offenders than with less serious offenders." ORRA scores can help the agency focus additional resources on those youth who need more treatment.

Increase public safety. While the agency has little direct influence over how many youth are committed to its custody, OYA does determine the specific close custody or residential placements for those youth. To protect the public, OYA places youth at higher risk of recidivating under higher levels of supervision. However, capacity in the system is not unlimited. Hence, the agency can consider ORRA scores along with treatment needs to inform placement decisions.

Furthermore, OYA has paroling authority for adjudicated juveniles committed to a youth correctional facility. Taken together with other available information about a youth, ORRA results can help gauge a youth's readiness for transition back into a community setting.

ORRA risk and sentencing. The similarity of ORRA risk distributions between the four populations groups implies that risk to recidivate has not been a strong consideration at the time of sentencing (Figure 1). In lieu of this, factors such as crime severity, victim statements, and the number of victims have no doubt had a larger influence in determining sentences. Making information about a youth's risk available to the judge, district attorney, the youth's lawyer, and family may make it possible to improve youth outcomes and conserve expensive resources without compromising public safety.

Foundation for future improvements in risk assessment. The current ORRA equation represents a starting point. Analysts fully anticipate that the model will evolve as we gain experience with the tool. Moreover, new data elements may become available and, as we expand our understanding of special factors that pertain to particular subpopulations, we hope to augment or refine ORRA. In the near term, analysts will begin evaluating the ORRA model for predictive accuracy against major subpopulations—such as sex, crime type, and race/ethnicity—to determine whether the tool is assessing risk appropriately for all youth.

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Appendix

List of potential predictor variables

Note: Variables remaining in the final OYA Recidivism Risk Assessment are identified with a solid bar on the left.

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
YOUTH ID	Foreign key that is a primary key on the Youth Table.
JJIS NUMBER	Number uniquely identifying a youth in the JJIS application. The JJIS number may be used on the youth search screen to find a particular youth. The JJIS number is created by the JJIS system and cannot be changed or deleted.
YOUTH NAME	Last, first and middle name of the youth.
DOB	Date indicating the month, day and year the youth was born.
CURRENT AGE	Youth's age as of the report run date.
AGE AT 1ST DELINQUENCY REFER	Age of the youth at the time of the first delinquency referral of the youth. This is determined by finding the earliest delinquency referral for the youth and extracting the age of the youth when that referral was received.
RACE/ETHN	Text that describes the ethnic physical traits of the youth, modified in certain cases for reporting purposes.
SEX > *Male*	Code that represents the gender of the youth as male, female, etc. The value of this column is derived from the Entity table in the JJIS production database.
SID #	Youth's state identification number.
DOC RECORD KEY	Record Identifier for the youth in Department of Corrections Information Systems.
EVENT	Name of the event for this record. Must be 'RELEASED FROM CLOSE CUSTODY', 'OYA PROBATION' or 'COUNTY PROBATION'. This is the 'group name' in the 'merged' cohort record.
RELEASE OR PROBATION DATE	The date the youth was released from close custody or placed on probation.

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
RELEASE REASON OR PROBATION DISPOSITION	The reason the youth was released from close custody or type of probation.
DISPOSITION ROLLUP START	The start date of the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISPOSITION ROLLUP END	The end date of the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISPOSITION TYPE CODE	The type code of the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISPOSITION TYPE DESCRIPTION	The disposition description of the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISPOSITION INTENSITY LEVEL	The intensity level of the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
INTENSITY RANKING	The intensity ranking of the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ALLEGATION ID 1	Allegation ID of the most serious allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ORS NUMBER 1	ORS number of the most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ORS DESCRIPTION 1	ORS description of the most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ORS TYPE CODE 1	ORS type code of the most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ORS CLASS CODE 1	ORS class code of the most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
DISP ORS SEVERITY CODE 1	ORS severity code of the most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP OFFENSE CATEGORY ROLLUP 1	Offense category rollup of the most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP OYA CATEGORY CODE 1 > *Current sex offense disposition*	OYA category code of the most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP REGISTERABLE CRIME FLAG 1	Flag to identify if the most severe offense for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation) is a registerable crime. (Y = Yes, N = No)
DISP SEX OFFENSE INDC 1	Indicator to identify if the most severe offense for youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation) is a sex crime. (1 = Yes, 0 = No)
DISP WEAPONS INDC 1	Indicator to identify if the most severe offense for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation) involved a weapon. (1 = Yes, 0 = No)
DISP ALLEGATION ID 2	Allegation ID of the second most serious allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ORS NUMBER 2	ORS number of the second most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ORS DESCRIPTION 2	ORS description of the second most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation)..
DISP ORS TYPE CODE 2	ORS type code of the second most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP ORS CLASS CODE 2	ORS class code of the second most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
DISP ORS SEVERITY CODE 2	ORS severity code of the second most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP OFFENSE CATEGORY ROLLUP 2	Offense category rollup of the second most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
OYA CATEGORY CODE 2	OYA category code of the second most severe allegation for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation).
DISP REGISTERABLE CRIME FLAG 2	Flag to identify if the second most severe offense for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation) is a registerable crime. (Y = Yes, N = No)
DISP SEX OFFENSE INDC 2	Indicator to identify if the second most severe offense for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation) is a sex crime. (1 = Yes, 0 = No)
DISP WEAPONS INDC 2	Indicator to identify if the second most severe offense for the youth's most recent disposition that matches the event type (County Probation, OYA Probation, OYA YCF, or DOC) that is less than or equal to the event release date (for YCF or DOC) or event probation date (for County Probation or OYA Probation) involved a weapon. (1 = Yes, 0 = No)
TOTAL PRIOR REFERALS WITH SEX OFFENSE INDC	Total number of referrals prior to the disposition start date with a sex offense. (The sex offense may not have been the most serious felony or misdemeanor offense on the referral.)
TOTAL PRIOR REFERALS WITH WEAPONS OFFENSE INDC > *Prior weapon offense referral*	Total number of referrals prior to the disposition start date with a weapons offense. (The weapon offense may not have been the most serious felony or misdemeanor offense on the referral.)
TOTAL PRIOR REFER WITH FEL ORIG ALLEG > *Total prior felony referrals*	Total number of referrals prior to the disposition start date with felony allegations.
TOTAL PRIOR REFER WITH MIS ORIG ALLEG > *Total prior misdemeanor referrals*	Total number of referrals prior to the disposition start date with misdemeanor allegations.
PRIOR MS FEL REFERRAL COUNT	Total number of referrals prior to the disposition start date where the most serious offense was a felony.
PRIOR MS FEL ARSON COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was arson.
PRIOR MS FEL ASSAULT COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was assault.
PRIOR MS FEL BURGLARY COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was burglary.

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
PRIOR MS FEL CRIMINAL_MISCHIEF COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was criminal mischief.
PRIOR MS FEL CRIMINAL OTHER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was criminal other.
PRIOR MS FEL DISORDERLY COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was disorderly conduct.
PRIOR MS FEL HOMICIDE RELATED COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was homicide related.
PRIOR MS FEL PERSON OTHER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was person other.
PRIOR MS FEL PROPERTY OTHER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was property.
PRIOR MS FEL PUBLIC ORDER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was public order.
PRIOR MS FEL ROBBERY COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was robbery.
PRIOR MS FEL SEX OFFENSE COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was a sex offense.
PRIOR MS FEL SUBSTANCE COUNT > *Prior felony drug or alcohol referral*	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was substance/alcohol.
PRIOR MS FEL THEFT COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was theft.
PRIOR MS FEL WEAPON COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious felony offense was weapon.
PRIOR MS MIS REFERRAL COUNT	Total number of referrals prior to the disposition start date where the most serious offense was a misdemeanor.
PRIOR MS MIS ARSON COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was arson.
PRIOR MS MIS ASSAULT COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was assault.
PRIOR MS MIS BURGLARY COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was burglary.
PRIOR MS MIS CRIMINAL_MISCHIEF COUNT > *Prior criminal mischief referral*	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was criminal mischief.
PRIOR MS MIS CRIMINAL OTHER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was criminal other.
PRIOR MS MIS CRIMINAL TRESSPASS COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was criminal trespass.
PRIOR MS MIS DISORDERLY COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was disorderly conduct.

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
PRIOR MS MIS HARASSMENT COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was harassment.
PRIOR MS MIS PERSON OTHER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was person other.
PRIOR MS MIS PROPERTY OTHER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was property other.
PRIOR MS MIS PUBLIC ORDER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was public order.
PRIOR MS MIS ROBBERY COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was robbery.
PRIOR MS MIS SEX OFFENSE COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was sex offense.
PRIOR MS MIS SUBSTANCE COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was substance/alcohol.
PRIOR MS MIS THEFT COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was theft.
PRIOR MS MIS WEAPON COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was weapon.
PRIOR MS VIO REFERRAL COUNT	Total number of referrals prior to the disposition start date where the most serious offense was a violation.
PRIOR MS VIO ALCOHOL COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was alcohol/MIP.
PRIOR MS VIO CURFEW COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was curfew.
PRIOR MS VIO HARASSMENT COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was harassment.
PRIOR MS VIO LESS THAN OUNCE COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was less than ounce.
PRIOR MS VIO MOTOR VEHICLE COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was motor vehicle.
PRIOR MS VIO NONCRIMINAL OTHER COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was non-criminal other.
PRIOR MS VIO SUBSTANCE COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was substance/alcohol.
PRIOR MS VIO THEFT COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was theft.
PRIOR MS VIO TOBACCO COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was tobacco.
PRIOR MS DST DEPENDENCY STATUS COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was dependency status offense other.
PRIOR MS DST RUNAWAY COUNT > *Total prior runaway referrals*	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was runaway.
PRIOR MS_FED_OTHER_COUNT	Total number of referrals prior to the disposition start date where the offense category rollup of the most serious offense was other.

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
PRIOR ADJUD DISP COUNT > *Prior delinquency adjudication*	Total number of adjudicated dispositions prior to the disposition start date. NOTE: all adjudicated dispositions are counted even if the disposition is a graduated sanction for the same offense. In the below example, the Burglary I offense will be counted for both the OYA Probation row and for the YCF Release row. Example: OYA Probation on 10/10/02 for Burglary I YCF Commitment on 12/19/02 for Burglary I
PRIOR OYA YCF DISP COUNT	Total number of OYA YCF commitment dispositions prior to the disposition start date. NOTE: all adjudicated dispositions are counted even if the disposition is a graduated sanction for the same offense. In the below example, the Burglary I offense will be counted for both the OYA Probation row and for the YCF Release row. Example: OYA Probation on 10/10/02 for Burglary I YCF Commitment on 12/19/02 for Burglary I
PRIOR OYA PROB DISP COUNT	Total number of OYA probation dispositions prior to the disposition start date. NOTE: all adjudicated dispositions are counted even if the disposition is a graduated sanction for the same offense. In the below example, the Burglary I offense will be counted for both the OYA Probation row and for the YCF Release row. Example: OYA Probation on 10/10/02 for Burglary I YCF Commitment on 12/19/02 for Burglary I
PRIOR COUNTY PROB DISP COUNT	Total number of county probation dispositions prior to the disposition start date. NOTE: all adjudicated dispositions are counted even if the disposition is a graduated sanction for the same offense. In the below example, the Burglary I offense will be counted for both the OYA Probation row and for the YCF Release row. Example: OYA Probation on 10/10/02 for Burglary I YCF Commitment on 12/19/02 for Burglary I
PRIOR DOC DISP COUNT	Total number of DOC commitments dispositions prior to the disposition start date. NOTE: all adjudicated dispositions are counted even if the disposition is a graduated sanction for the same offense. In the below example, the Burglary I offense will be counted for both the OYA Probation row and for the YCF Release row. Example: OYA Probation on 10/10/02 for Burglary I YCF Commitment on 12/19/02 for Burglary I
PRIOR OTHER AGENCY COUNT	Total number of Other Agency commitment dispositions prior to the disposition start date. NOTE: all adjudicated dispositions are counted even if the disposition is a graduated sanction for the same offense. In the below example, the Burglary I offense will be counted for both the OYA Probation row and for the YCF Release row. Example: OYA Probation on 10/10/02 for Burglary I YCF Commitment on 12/19/02 for Burglary I
REVOKED SINCE RELEASE	Indicator to identify if the youth has been revoked since their release from close custody. (1 = Yes, 0 = No)
FIRST REVOKE SINCE RELEASE	The date of the youth's first revocation since their release from close custody.

ORIGINAL FIELD NAME > *ORRA Variable Name*	DESCRIPTION / COMMENTS
PRIOR CLOSE CUSTODY EPISODES	Total number of the close custody episodes prior to the disposition start date.
PRIOR CLOSE CUSTODY DAYS	Total number of days for the prior close custody episodes.
PRIOR DETENTION EPISODES	Total number of the detention episodes prior to the disposition start date.
PRIOR DETENTION DAYS	Total number of days for the prior detention episodes.
PRIOR SUBCARE EPISODES	Total number of prior subcare episodes prior to the disposition start date.
PRIOR SUBCARE DAYS	Total number of days for the prior subcare episodes.
ANALYST-CREATED VARIABLE > *Age at start tracking*	Age at probation start or release to community from close custody. (Release or Probation Date – Date of Birth)/365.25
ANALYST-CREATED VARIABLE > *Total prior drug or alcohol referrals*	PRIOR MS FEL SUBSTANCE COUNT + PRIOR MS MIS SUBSTANCE COUNT + PRIOR MS VIO ALCOHOL COUNT + PRIOR MS VIO LESS THAN OUNCE COUNT + PRIO MS VIO SUBSTANCE COUNT
ANALYST-CREATED VARIABLE > *Total prior theft referrals*	PRIOR MS FEL THEFT COUNT + PRIOR MS MIS THEFT COUNT + PRIOR MS VIO THEFT COUNT