Validating Multnomah County's Juvenile Detention Risk Assessment Instrument

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Table of Contents

EXECUTIVE SUMMARY

This report presents the findings of a study to validate Multnomah County's juvenile detention risk assessment instrument (RAI). Using a validated risk instrument is an essential component of detention reform initiatives as it lends confidence that expensive secure detention resources are used only for those youth at highest risk of defying the court's orders or threatening public safety. This study examined the relationship between each item on the RAI and the youth's likelihood of either failing to appear for a scheduled court appearance (FTA) or committing a new law violation once released to the community. Key findings include:

- While a larger number of RAI items had positive, statistically significant relationships to the outcome variables (FTA/new offense), not all of these needed to be included on the instrument to achieve the desired result. Instead, a smaller constellation of risk factor could produce the same results while limiting the workload for staff. The original RAI utilized 21 risk factors, while the validated RAI uses only 6, four of which can be auto-scored by the County's information system. The combination of the items on the new RAI produces better risk classifications than the set of items included on the original RAI.

- The most parsimonious constellation of items included:
  - Currently Under Supervision
  - Most Serious Pending Offense
  - School/Employed (Mitigating Factor)
  - First Referral at Age 16 (Mitigating Factor)
  - Instant Offense is 1st Offense (Mitigating Factor)
  - History of Runaway from Home or Placement (Aggravating Factor)

  Not only did this set of factors produce the best results for the total population, but also produced solid results when the population was split by gender and ethnicity.

- The scoring convention for the new RAI needed to be grounded in some sort of logic, mathematical or otherwise. Limiting the number of possible points to award is preferable because it reduces the frequency of mathematical errors and thereby improves inter-rater reliability. In some cases, it made sense to maintain the scoring convention used by the original RAI, providing it was in keeping with the relative strength of the item's relationship to recidivism. The risk items Currently Under Supervision and Most Serious Pending Offense were two such items. Workload issues in re-programming the state's JJIS were also motivating factors for trying to keep the scoring rubric for Most Serious Pending Offense the same. Many points could potentially be allocated for the Most Serious Pending Offense risk factor, so it was vital to calibrate the weights for the other items properly so that the Most Serious Pending Offense did not overpower the instrument. Points for the Mitigating and Aggravating risk factors were therefore increased accordingly. The Mitigating Factors items were among those with the most powerful relationship to the outcome variables, so allocating more points than Currently Under Supervision was logical.

- Cut points were needed for each of the decision categories (unconditional release, conditional release and detain). The outcome variable, recidivism, was constructed as a continuous variable (i.e., time-to-failure) rather than a dichotomous one. As opposed to using a dichotomous variable which allows statements such as, "offenders in the unconditional release group had a 30% failure

rate, whereas offenders in the conditional release group had a 45% failure rate," using a continuous variable necessitates comparing the length of time to failure—with longer times being better, of course. Placing the cut points at less than zero, zero to 5, and 6 or more points produced groups with significantly different times-to-failure.

- Once the item weights and cut points were determined, the impact of the new RAI on the study population (n=3,945 episodes) was simulated to assess the magnitude of changes in the size of the detention population. Compared to the original RAI, the new RAI would decrease the number of youth scoring in the Detain category from 25% of cases to 15% of cases. Many of these cases would instead score in the Conditional Release category, which under the new RAI accounts for 58% of the cases, as compared to only 27% under the original RAI. Finally, the proportion of cases that would score in the Unconditional Release category would decrease from 47% to 27% under the new RAI, with most of these cases now scoring in the Conditional Release category.

- To determine the precise impact of the new RAI and to ensure its proper implementation, the following recommendations are made:

✓ Continue efforts to develop buy-in for the validated RAI instrument among all stakeholders including DCJ administrators and managers, Probation staff, Juvenile Hall staff, judges, prosecutors, defense attorneys, police, and others with a specific interest in how the County utilized detention resources.

✓ Automate the validated RAI to permit autoscoring of those items for which the required information is already maintained by JJIS.

✓ Develop a user's manual and train staff accordingly.

✓ Overhaul the override policy. Re-train staff on which mandatory and discretionary overrides are permitted and the process for invoking them. Require supervisory approval of all overrides to the detention decision suggested by the RAI score. (This process was ongoing at the time this report was issued).

✓ Once the new override policy is finalized, pilot test the validated RAI for a period of time to ascertain its overall impact on the detention population and the proportion of youth released both conditionally and unconditionally.

✓ If the Conditional Release population expands as predicted, ensure sufficient capacity is available to adequately supervise these youth. Conduct research to determine which conditional release options work best for which types of youth and require fidelity to this research when making release decisions.

✓ Track the FTA/recidivism rates of youth who are released to the community under the direction of the validated RAI. Discuss with stakeholder groups whether these failure rates are acceptable and make adjustments to the scale cut points if needed.

PURPOSE

Reform efforts targeting the detention population focus on two essential processes: 1) limiting the size of the detention population by setting risk-based thresholds to ensure that only those who pose a legitimate threat to public safety are admitted to detention; and 2) developing an array of alternatives to secure detention that offer a range of supervision and programming options. As these two strategies coalesce, jurisdictions committed to reform realize significant reductions in the use of secure detention.

Since 1998, Multnomah County has been a national model for jurisdictions interested in enacting detention reform. With support from the Annie E. Casey Foundation[1], Multnomah County has implemented nearly all of the key components of a multifaceted reform effort, save for one essential task: validating its detention risk screening instrument to ensure it provides sound guidance in determining who should be admitted to detention.

Although its use has led to positive changes and a drastic reduction in the number of youth who are held in secure detention, the County's Risk Assessment Instrument (RAI) has never been validated. In other words, the strength of the relationship between the items and score on the RAI and the youth's likelihood of failing to appear in court (FTA) or committing a new offense while in the community pending court has not been tested. By testing the relationship between the RAI items and the outcome variables, we learn which items work best, and in which combinations, to identify youth who can be safely released to the community. A validation study may show that the RAI works best as it is; alternately, it could show that the same or better results could be achieved using a constellation of fewer items. This report presents the key findings of the validation study.

The County's RAI uses a constellation of seven factors to derive a score thought to be associated with the youth's risk to public safety. More specifically, higher scores are thought to indicate a higher risk of failing to appear (FTA) for subsequent court dates or a higher risk to commit a new law violation pending adjudication. Youth who score 12 or more points on the RAI are detained; those scoring between 7 and 11 points are released conditionally; and youth scoring 6 or fewer points are released unconditionally. There are also a set of overrides and special detention cases which automatically detain the youth.

Proper use of the RAI should balance the duty to protect public safety with the liberty interests of the youth. In other words, validating the RAI gives confidence that the instrument identifies the correct youth for release; that is, those youth at relatively low risk of FTA or committing a new crime. The relationship between the total score on the RAI and the outcome variables indicates whether the constellation of risk factors, the weight assigned to those factors and the scale's cut points could be adjusted to better guide the release of low-risk youth and the detention of high-risk youth.

[1] Refer to the Annie E. Casey's *Pathways to Detention Reform* for a more complete discussion of the report efforts. These reports are available online: http://www.aecf.org/Home/KnowledgeCenter/PublicationsSeries/JDAIPathways.aspx

METHODOLOGY

Data were extracted from the state's Juvenile Justice Information System (JJIS) on all cases screened using the RAI between August, 2004 and May, 2006. A total of n=3,945 events were included in the sample.[2] These events were split into two groups, conceptualized as those who were at risk of failure (i.e., are released to the community) and those who were not at risk of failure (i.e., are detained and therefore do not have the opportunity to FTA or commit a new offense).

- *Not at Risk:* A total of n=2,551 events comprised this group. These data were used in a relatively limited fashion: the distribution of scores across items and total scores were examined and compared to those of youth who were released to the community.

- *At Risk*: A total of n=1,394 events comprised this group and these data provided the foundation for the bulk of the validation effort. The relationships between item scores and performance in the community (i.e., FTA or new offense) were analyzed to determine the power of the items to classify offenders according to the risk of a negative outcome.

Each of the n=1,394 "at risk" events represents an episode. The starting point of the episode was the youth's being assessed using the RAI and subsequent release to the community.[3] The ending point of the episode was the next scheduled court date (preliminary hearing or disposition). The outcome of this episode represents the dependent variable, (i.e., the event that the RAI is designed to predict). There are two possibilities:

- *Success*: the youth appeared in court as scheduled; or

- *Failure*: the youth either failed to appear in court or committed a new law violation while in the community pending court.[4]

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[2] The term "event" was chosen to distinguish the cases being used in the sample from "court cases," and also because each youth may be scored multiple times using the RAI, so that there are multiple "events" from any one youth.

[3] More specifically, the following JJIS events were used to identify the starting points of each "at-risk" episode: 1) *Non-court ordered Screenings (RAI administered) with a decision to release* (the non-court ordered part is designed to avoid cases in which a decision was made by the court to detain the kid—either at prelim or as a sentence to JH—and to focus exclusively on those situations in which the RAI is given in order to make a decision about detention). 2) *Preliminary Hearings with a decision to release* (to capture the youth who may have been detained when they first arrived at JH (i.e., not at risk), but the court decides to release to the community—kicking off the time in which the youth is at risk of failure) 3) *Release dates occurring after the Preliminary Hearing, but before the Disposition date* (to capture those you who the court may have released pending some sort of logistical issue, such as setting up electronic monitoring or waiting for a relative to return to town)

[4] More specifically, the following JJIS events were used to identify the ending point of the "at-risk" episode: 1) *Preliminary hearing* (if the youth appeared, episode was classified as a success); 2) *Disposition* (if the youth appeared for all scheduled court hearings and did not commit a new offense prior to disposition, the episode was classified as a success); 3) *FTA at Preliminary Hearing* (episode was classified as a failure); 4) *Subsequent Screening, non-court ordered* (indicative of a new offense/PV; the non-court ordered requirement excluded cases in which the court decided to continue the detention—a new RAI is administered, but it doesn't actually have the power to release the youth. Such cases were classified as a failure); and 5) *New Law Violation recorded by police, but not involving a trip to Juvenile Hall* (some police departments screen the youth in the field; episode was classified as a failure, even though the youth was not transported to Juvenile Hall).

A hazard analysis was used to determine the relationship between each of the items on the RAI and the dependent variable (i.e., success or failure). A hazard analysis is a multivariate technique commonly used in recidivism studies. Understanding multivariate analysis requires an appreciation of the nature of "causality." We may hypothesize that substance abuse and crime are related to each other, or that substance abuse "causes" crime. This relationship may even be demonstrated in a bivariate analysis showing that people who abuse substances are more likely to commit crime than people who do not abuse substances. However, relationships between such factors are more complex than the bivariate analysis would suggest. There are many other factors in play—employment, criminal history, mental health issues—which are all uncontrolled in a bivariate analysis. These uncontrolled factors bring "noise" into the analysis and make the results undependable. Through bivariate analysis, it is not possible to determine whether it is the factor of interest (e.g., substance abuse) or an underlying factor (e.g., employment) that is causing the variation in the outcome variable.

A multivariate analysis solves this problem by isolating the impact of each variable (e.g., substance abuse) by holding all of the other variables constant (e.g., employment, criminal history, mental health issues). As a result, factors that appeared to have a significant relationship to crime in the bivariate analysis may no longer have a significant relationship in the multivariate analysis. This occurs when the other factors are actually driving the observed differences in crime. Multivariate analysis identifies those factors that have a significant relationship to the outcome variable *when all other factors are controlled.*

In particular, the hazard analysis technique is useful in situations where the offenders' time at risk varies considerably. In addition to stabilizing the other factors, the hazard analysis also stabilizes differences in the time at risk. Hazard analysis conceptualizes recidivism as a continuous variable, rather than the traditional dichotomous variable. Instead of recidivism being defined as "success" or "failure," hazard analysis uses the "time to recidivate" as the outcome measure.

FINDINGS

Item-by-Item Analysis

The hazard analysis produced a set of statistics useful for evaluating the relative power of each item to estimate the risk of FTA/new criminal behavior. Rudimentary methods for understanding these statistics are presented below:

- **B stands for the Beta coefficient**. A positive B means that the item was positively related to the risk of FTA/new offense. In other words, as the score increased, the risk of FTA/new offense increased. This relationship is assumed for most of the items on the RAI—a higher score would indicate the youth should be detained. A negative Beta coefficient means that the item operates in the wrong direction. In other words, as the score on the item decreased, youth were *less likely* to FTA/commit new offense. So, for all of the items, a positive Beta coefficient is desired.

- **Sig. stands for the statistical significance**. Given the weighty consequence of the release decision, the threshold for statistical significance was set at 0.01 to ensure that differences

observed were caused by differences in the independent variables (i.e., the risk factors), and not caused by chance.

- **Exp(B) stands for the Exponentiated B**. Exp(B) is a measure of the effect size, or the relative strength of the relationship between the risk factors and the outcome variables. Bigger is better. One way to interpret this statistic is to view the numbers following the decimal point as a percentage. That percentage represents the increased likelihood of failure for a 1-point change in the score. For example, 1.350 would be interpreted as: for every 1-point change in the score on the item, a youth is 35% more likely to FTA/reoffend. If compared to a 1.200, in which youth would be 20% more likely to fail with every 1-point change in score, the first item would be the stronger one. So, items with a larger Exp(B) value are desired. Note that this interpretation has no practical application, and should not be interpreted as a prediction of the odds of recidivism. The statistic is simply used as a metric for comparing the strength of the risk factors to each other.

In each section below, the item analysis for each risk factor on the RAI is discussed. The statistics generated for the original item are presented, along with recommendations for refining the risk factors to strengthen the relationship to the outcome indicator, to reduce workload, or both. Many iterations of the risk factors were devised in the process of isolating the particular construction or constellation with the strongest relationship to FTA/new offense. Only the strongest variations are presented here, and the full set of variations is available in the Appendices to this report. Item analysis by gender and race is available upon request by contacting the authors.

1. Most Serious Instant Offense

This item awards a greater number of points for offenses that are more serious. In other words, the thought is that present behavior may predict future behavior. Therefore, it would follow that youth who are admitted on more serious offenses may be more likely to commit a serious offense in the future.

Table 1. Most Serious Instant Offense—Original			
Item	B	Sig.	Exp(B)
Most Serious Instant Offense	-0.102	0.000	0.903

The relationship between the risk factor and the dependent variable is significant (0.000), but the negative Beta indicates that the item operates in the wrong direction with regard to the likelihood of FTA/committing new offense. As the number of points on this item goes up, the likelihood of failure goes down. In other words, the item would suggest detaining youth at lower risk of FTA/ new offense, while releasing youth with higher risk of FTA/new offense. This same pattern was found when the sample was split by gender and ethnicity—in all situations, youth who scored more points on the item were less likely to FTA or commit a new offense. Because it operates in the wrong direction, it impairs the RAI's ability to properly classify youth according to risk.

Before recommending dropping the item from the RAI, its ability to identify different types of risk was assessed. For each offense category scored on the RAI, the distribution of recidivating offenses was assessed to discern whether those youth with more violent instant offenses also had more violent subsequent

offenses. This analysis was conducted using two methods: the offense category itself and the offense severity score assigned by the State of Oregon. Neither of these analyses suggested that youth with more serious instant offenses were more likely to commit violent subsequent offenses compared to those with less serious instant offenses. Therefore, dropping the item from the RAI is recommended.

2. Additional Current Offenses

As a matter of practice, this variable is not used. It was scored in only 4 of the 1,394 events. Therefore, it cannot be analyzed.

3. Legal Status

This is a composite item, meaning that multiple risk factors combine to form the Legal Status score.

Table 2. Legal Status—Original			
Item	B	Sig.	Exp(B)
Legal Status ▪ Currently Under Supervision ▪ Felony Violence/Asslt/DV/Firearm ▪ Most Serious Pending Offense ▪ On Conditional Release	0.313	0.000	1.368

All of the variables were significant, except for Conditional Release (analysis not shown). Using the shorthand interpretation of the Exp(B) statistics, for every 1-point increase in score, youth were 37% more likely to FTA/commit new offense. This item had a statistically significant relationship to the outcome variables for males and females, and for white and Black youth. The item's relationship to the outcome variables was not statistically significant for Hispanic youth, but it operated in the proper direction (i.e., higher scores lead to higher rates of FTA/commitment a new offense).

Several variations of this item were tested in an effort to find a combination with a stronger relationship to the outcome variables using fewer risk factors. The best combination is presented below (all of the iterations are presented in the Appendix to this report).

Table 3. Legal Status—Recommended			
Item	B	Sig.	Exp(B)
Legal Status ▪ Currently Under Supervision ▪ Most Serious Pending Offense	0.310	0.000	1.364

The composite item above uses only two of the original four risk factors, Currently Under Supervision and Most Serious Pending Offense, and has a comparable strength of association with the outcome variable as the original item. Interestingly, although it uses the same scale as the Most Serious Instant Offense which was found to be negatively associated with the outcome variables, the Most Serious Pending Offense item proved to have a statistically significant, positive relationship to the outcome variables, suggesting that the charging decisions made by prosecutors provided a useful filter for sorting youth of different risk levels. This particular constellation of the Legal Status Item was the strongest option across both genders and all ethnicities. Though it still does not have a statistically significant relationship to the outcome variables for Hispanic youth, it does operate in the right direction.

Sufficient data were available through JJIS to test two new legal status variables for consideration for the RAI:

- Most Serious Allegation in the Past 90 Days
- Total Number of Allegations in the Past 90 Days

Using *allegations* instead of pending offenses would capture the full range of youth behavior and would not be influenced by court practices. However, the Most Serious Allegation variable was not statistically significant, and also operated in the wrong direction in its relationship to FTA/new offense. The Number of Allegations was statistically significant and operated in the expected direction, but comparisons of the Exp(B) statistic revealed it was not as strong as the other Legal Status variables, either alone or in combination (e.g., Exp(B) approximately 1.15 versus approximately 1.36). Thus, the option described in Table 3, above, is recommended.

4. Warrants History

This item awards points for each warrant (excluding traffic and dependency) during the past 18 months.

Table 4. Warrants History—Original			
Item	B	Sig.	Exp(B)
Warrants History	0.175	0.000	1.191

This risk factor had a moderately strong, statistically significant relationship to the outcome variables when tested on the population as a whole. However, analysis by gender and ethnicity revealed that the variable was not significant for females or for Hispanic youth. It does have a positive relationship, and is not penalizing youth of these groups in any way, but it is not particularly useful in accurately classifying them according to risk. No modifications were made to this item and it was considered, and rejected, for inclusion in the revised RAI in its original form. These analyses are discussed in later in this report.

5. Prior Sustained Offense

This item awards points for each prior sustained offense. More points are awarded for felony offenses than misdemeanors.

Table 5. Prior Sustained Offense—Original			
Item	B	Sig.	Exp(B)
Prior Sustained Offense	0.233	0.000	1.263

This risk factor had a moderately strong, statistically significant relationship to the outcome variables when tested on the population as a whole. However, analysis by gender and ethnicity revealed that the variable was not significant for females or for Hispanic youth. It does have a positive relationship, and is not penalizing youth of these groups in any way, but it is not particularly useful in accurately classifying them according to risk. No modifications were made to this item and it was considered, and rejected, for inclusion in the revised RAI in its original form. These analyses are discussed later in this report.

6. Mitigating Factors

This is a composite item, meaning that multiple risk factors combine to form the Mitigating Factors score.

Table 6. Mitigating Factors—Original			
Item	B	Sig.	Exp(B)
Mitigating Factors—Original ▪ School/Employed ▪ Responsible Adult ▪ No Referrals past year ▪ First Referral Age 16+ ▪ Instant Offense is First Referral ▪ Not on Probation ▪ No FTA Warrant History	0.267	0.000	1.306

All of the risk factors had a statistically significant relationship to the outcome variables, except for Not on Probation and No FTA Warrant History. These two variables operated in the wrong direction as well, which limited the overall usefulness of the Mitigating Factors item. The non-significant risk factors should be dropped from the RAI. In its current form, using the shorthand interpretation of the Exp(B) statistic, we can see that for every 1-point increase in score, youth were 31% more likely to FTA/commit new offense.

Several variations of this item were tested in an effort to find a combination with a stronger relationship to the outcome variables using fewer risk factors. The best combination is presented below (all of the iterations are presented in the Appendix to this report).

Table 7. Mitigating Factors—Recommended			
Item	B	Sig.	Exp(B)
Mitigating Factors ▪ School/Employed ▪ First Referral Age 16+ ▪ Instant Offense is First Referral	0.368	0.000	1.445

Removing the two variables that operated in the wrong direction led to substantial increases in the Exp(B) statistic, indicating an improved ability to classify youth according to risk. The most parsimonious constellation, above, was the strongest option for males, whites, and Hispanics. It was not the strongest option for females or Blacks, but was sill among the top choices in terms of the size if the Exp(B) statistic.

7. Aggravating Factors

This is a composite item, meaning that multiple risk factors combine to form the Aggravating Factors score.

Table 8. Aggravating Factors—Original			
Item	B	Sig.	Exp(B)
Aggravating Factors ▪ No Community Ties ▪ Possession of Firearm ▪ Runaway—Home and Placement ▪ Runaway—Placement Only ▪ Multiple Victims ▪ Threats to Victim/Witnesses	0.082	0.050	1.086

The Beta statistic for the composite item, Aggravating Factors, was not significant at the .01 level. Two of the risk factors, No Community Ties and Possession of Firearm, operated in the wrong direction. Anticipating that dropping these items from the RAI would be controversial, additional analyses were conducted to verify the limited utility of these two risk factors. The No Community Ties risk factor was not related to the outcome measures for youth of any ethnicity. That is, youth scoring points on this variable were no more or less likely to FTA/commit new offense than those who did not score points on this variable. This was true across white, Black, and Hispanic youth. Further, the risk factor Possession of a Firearm was assessed for its ability to predict future violent re-offending. The analysis tested whether youth who scored a point on the Possession of Firearm risk factor had more serious subsequent law violations than those who did not. The sample was too small for meaningful analysis, most likely because many of those who possessed firearms were detained and therefore not in the "at risk" group that formed the study sample. Only 20 youth scored a point on this item, and only 6 of those re-offended.

Given the lack of evidence that either item provides an enhanced capacity to classify youth according to risk, the two risk factors should be dropped from the RAI. Of the remaining 4 variables, only the two Runaway risk factors had a statistically significant relationship to the outcome variables.

Several variations of this item were tested in an effort to find a combination with a stronger relationship to the outcome variables using fewer risk factors. The best combination is presented below (all of the iterations are presented in the Appendix to this report).

Table 9. Aggravating Factors—Recommended			
Item	B	Sig.	Exp(B)
Aggravating Factors ▪ Runaway—Home and Placement	0.165	0.000	1.179

Although using both of the Runaway risk factors together revealed a statistically significant relationship to the outcome variables, using both of them would have been confusing to staff. Further, using only Runaway—Home and Placement, lead to a larger Exp(B) statistic than the other options. This option was also among the strongest among all subpopulations when split by gender and ethnicity. Although the new iteration increased the Exp(B) statistic from 1.086 to 1.179, the Aggravating Factors item continues to have the weakest relationship to the outcome variables, compared to the other risk factors on the instrument.

8. Overall Score

The overall score is derived by adding the points awarded/subtracted on the 21 risk factors that comprise the 7 RAI items, as shown in Table 10, below.

Given the poor results for the Most Serious Instant Offense item and the lack of utility of the Additional Current Offenses item, we tested the remaining 5 RAI items in various combinations to identify the constellation with the strongest relationship to the risk of FTA/new offense. Once these options were developed using the total sample, each option was tested for its efficacy for the various subpopulations (males/females; white/Black/Hispanic youth). Within each subpopulation, the various options were ranked (i.e., those with the highest Exp(B) statistic were ranked #1, the next highest ranked #2, and so on). Across the five populations, the rankings were totaled to identify the option with the highest combined ranking. This best option is presented in Table 11 below, along with the statistics for each of the subpopulations (the full range of options considered is presented in the Appendix; analyses for the various subpopulations are available upon request from the authors).

Table 10. Original RAI			
Item	B	Sig.	Exp(B)
Most Serious Instant Offense	0.271	0.000	1.311
Additional Current Offense			
Legal Status—Original			
▪ Currently Under Supervision			
▪ Felony Violence/Asslt/DV/Firearm			
▪ Most Serious Pending Offense			
▪ On Conditional Release			
Warrants History			
Prior Sustained Offense			
Mitigating Factors—Original			
▪ School/Employed			
▪ Responsible Adult			
▪ No Referrals past year			
▪ First Referral Age 16+			
▪ Instant Offense is First Referral			
▪ Not on Probation			
▪ No FTA Warrant History			
Aggravating Factors—Original			
▪ No Community Ties			
▪ Possession of Firearm			
▪ Runaway—Home and Placement			
▪ Runaway—Placement Only			
▪ Multiple Victims			
▪ Threats to Victim/Witnesses			

Table 11. Recommended RAI				
Item	Group	B	Sig.	Exp(B)
Legal Status	Total	0.398	0.000	1.488
▪ Currently Under Supervision				
▪ Most Serious Pending Offense	Male	0.406	0.000	1.501
Mitigating Factors	Female	0.344	0.000	1.410
▪ School/Employed				
▪ First Referral Age 16+	White	0.405	0.000	1.500
▪ Instant Offense is First Referral	Black	0.347	0.000	1.415
Aggravating Factor	Hispanic	0.364	0.020	1.439
▪ Runaway—Home and Placement				

Item Weights and Cut Points

As discussed above, the following six risk factors, in combination, had the strongest relationship to the youth's risk of FTA/new offense. Not only did this set of factors produce the best results for the total population, but also produced solid results when the population was split by gender and ethnicity.

- Currently Under Supervision
- Most Serious Pending Offense
- School/Employed
- First Referral at Age 16
- Instant Offense is 1st Offense
- History of Runaway from Home or Placement

Given these six risk factors, the next phase of the research was to develop a method for scoring the new instrument that, based on data, provided for homogenous groups with different likelihoods of FTA/committing a new offense. In other words, youth scoring into the various categories should be similar to each other, and youth scoring into different categories should have different likelihoods of FTA/committing a new offense. These recommendations are based purely on data—no effort was made to mimic the current proportions of youth who are released or detained.

The outcome used throughout this research was recidivism, defined as either a new law violation pending the next court date or a failure to appear for a scheduled court date. Current thinking in the field is moving away from viewing recidivism as a dichotomous variable—meaning rating each episode as a success or failure. Instead, better results are achieved when recidivism is viewed as a continuous variable—meaning that each episode is assessed for the length of time prior to the recidivism event (i.e., time-to-failure). Adopting this viewpoint underlies the analytical strategy discussed above, the Hazard Analysis, because of its ability to control for time-to-failure. When developing the item weights and scale cut points, this construction of recidivism means that results are presented not as whether youth recidivated or not, but rather *how long it took* for members of each group to recidivate. Therefore, we can not evaluate the promise of the scoring convention using the traditional rate of Type I and Type II errors, but rather must look at whether it produces groups that have significantly different times-to-failure.

Risk Population Profile Using the New RAI

The new RAI includes six items, four of which are dichotomous and two of which have multiple levels. The original study population was split into two groups for the purpose of determining the relationship of the items to the outcome variables—those who were at risk of FTA/new offense (i.e., those who were released to the community=Released) and those who were not at risk of FTA/new offense (i.e., those who were detained pending their next court date=Detained). These distinctions are less important when describing the impact of the new RAI on the total population, but are shown here for the sake of completeness. The total sample included n=3,945 episodes, each representing a youth being scored on the RAI. A single youth is likely to have multiple episodes. These n=3,945 total episodes involved n=1,468 individual youth at different points in time.

Table 12. Distribution Across Risk Items						
Item	**Total**		**Detained**		**Released**	
	N=3,945	%	N=2,551	%	N=1,394	%
Currently Under Supervision (score most serious)						
Parole/Committed to YCF/Probation	2094	53	1806	71	288	21
Def Dispo/Acctab Agrmt/Sole Sanction	138	4	67	3	71	5
No Formal Supervision	1713	43	678	27	1035	74
Most Serious Pending Offense (score most serious)						
Intentional homicide	~	~	~	~	~	~
Att Murder/ A Felony with violence or weapon	21	<1	21	1	~	~
B Felony with violence or weapon	45	1	34	1	11	1
Rape I/Sod I/Sex Pen I w/out forcible cmplsion	11	<1	9	<1	2	<1
C Felony with violence or weapon	117	3	88	3	29	2
All other A and B felonies	195	5	147	6	48	3
All other C felonies/ Misd with viol/weapon	451	11	323	13	128	9
All other misdemeanors/PV	947	24	758	30	189	14
No pending offense, or status offense only	2158	55	1171	46	987	71
Mitigating Factors (score all that apply)						
School/Employed	1126	29	508	20	618	44
First offense at age 16+	280	7	109	4	171	12
Instant offense is 1st offense	376	10	98	4	278	20
Aggravating Factor						
Runaway from home or placement	691	18	605	24	86	6

Key characteristics of the total youth population are highlighted below.

- About 60% were currently under some form of supervision.
- Only about 5% of the youth had pending offenses that were violent felonies. About 55% did not have any pending offenses, or the only ones they did have were status offenses. The youth who were released using the original RAI were far more likely to be without a pending offense than those who were detained using the original RAI.
- Only about 30% of the total population were identified as being in school or employed. This proportion could increase as procedures around collecting this information improve.
- Slightly fewer than 20% of youth had a history of runaway from home or placement.

Item Weights and Scale Cut Points

The scoring convention for the New RAI needed to be grounded in some sort of logic, mathematical or otherwise. Limiting the number of possible points to award is preferable because it reduces the frequency of mathematical errors and thereby improves inter-rater reliability. In some cases, it made sense to maintain the scoring convention used by the original RAI, providing it was in keeping with the relative strength of the

item's relationship to recidivism. The risk items Currently Under Supervision and Most Serious Pending Offense were two such items. Workload issues in re-programming the state's JJIS were also motivating factors for trying to keep the scoring rubric for Most Serious Pending Offense the same. Many points could potentially be allocated for the Most Serious Pending Offense risk factor, so it was vital to calibrate the weights for the other items properly so that the Most Serious Pending Offense did not overpower the instrument. Points for the Mitigating and Aggravating risk factors were therefore increased accordingly. The Mitigating Factors items were among those with the most powerful relationship to the outcome variables, so allocating more points than Currently Under Supervision was logical. The recommended weights appear in Table 13, below.

Table 13. Scoring Convention for New RAI

Item	Proposed Weight
Currently Under Supervision (score most serious)	
Parole/Committed to YCF/Probation	2
Def Dispo/Acctab Agrmt/Sole Sanction	1
No Formal Supervision	0
Most Serious Pending Offense (score most serious)	
Intentional homicide	17
Att Murder/ A Felony with violence or weapon	12
B Felony with violence or weapon	8
Rape I/Sod I/Sex Pen I w/out forcible compulsion	7
C Felony with violence or weapon	6
All other A and B felonies	5
All other C felonies/ Misdemeanor with viol/weapon	3
All other misdemeanors/PV	1
No pending offense, or status offense only	0
Mitigating Factors (score all that apply)	
School/Employed	-3
First offense at age 16+	-3
Instant offense is 1st offense	-3
Aggravating Factor	
Runaway from home or placement	3

With these weights assigned, the next step was to re-score all of the episodes contained in the original study sample to determine appropriate cut points on the scale. The scores ranged from -9 to 17 points. Table 14, below, shows the number of episodes with each score in the range.

Table 14. Distribution of Scores, using New RAI						
Total Score	Total		Detained		Released	
	N=3,945	%	N=2,551	%	N=1,394	%
-9	68	2	14	1	54	4
-6	223	6	56	2	167	12
-5	11	<1	1	<1	10	1
-4	8	<1	3	<1	5	<1
-3	400	10	87	3	313	23
-2	51	1	14	1	37	3
-1	291	7	232	9	59	4
0	568	14	248	10	320	23
1	99	3	47	2	52	4
2	573	15	475	19	98	7
3	608	15	462	18	146	11
4	76	2	52	2	24	2
5	372	9	326	13	46	3
6	374	10	330	13	44	3
7	71	2	64	3	7	1
8	98	3	87	3	11	1
9	14	<1	14	1	~	~
10	15	<1	14	1	1	<1
11	5	<1	5	<1	~	~
12	12	<1	12	1	~	~
14	6	<1	6	<1	~	~
15	1	<1	1	<1	~	~
17	1	<1	1	<1	~	~

Cut points were needed for each of the decision categories (unconditional release, conditional release and detain). As mentioned earlier, the outcome variable, recidivism, was constructed as a continuous variable (i.e., time-to-failure) rather than a dichotomous one. As opposed to using a dichotomous variable which allows statements such as, "offenders in the unconditional release group had a 30% failure rate, whereas offenders in the conditional release group had a 45% failure rate," using a continuous variable means that we must compare the length of time to failure—with longer times being better, of course. It is essential to remember that structured decision making is not about *prediction*, but about *classification*. None of the instruments in use can predict how a specific offender will behave. Instead, they can only classify offenders into groups that are likely to behave in a certain way. The goal is to get the offender in the right group, not to predict individual behavior.

Determining the cut-points for the various decision categories required searching for the point in the distribution of scores at which the time-to-failure changed markedly. All of the "release" episodes from our original data set were re-scored using the new RAI, and their time-to-failure was analyzed. Table 15, below, shows the cut-points that resulted in the most homogeneous groups with the greatest separation from each other in terms of the time-to-failure. Placing the cut points at less than zero, zero to 5, and 6 or more points

produced groups with significantly different times-to-failure. Note that the Original RAI produced time-to-failure averages that are not linear and that do not have good separation.

Table 15. Days to Failure, Original RAI and New RAI		
Detention Decision	**Original RAI** (Range -9 to 74 points)	**New RAI** (Range -9 to 22 points)
Unconditional Release	142 days (6 points or less)	171 days (Less than 0 points)
Conditional Release	75 days (7 to 11 points)	92 days (0 to 5 points)
Detain	97 days* (12 points or more)	55 days (6 points or more)
these youth scored in the detain category, but were overridden to the release category, thus their time at risk could be calculated		

Table 14, above, highlights the distribution of scores according to the recommended release decision. These are discussed in greater depth in the following section. Setting the threshold for "Detention" at 6 points had an unintended consequence that is believed to further strengthen the recommendations. As shown in Table 13, under the Most Serious Pending Offense, all felony offenses with violence or weapon score at least 6 points, meaning that a presumption of detention will accompany offenders with these types of pending offenses.

In summary, the recommended RAI cut points are as follows:
- Unconditional Release = less than zero points
- Conditional Release = between zero and 5 points
- Detention = 6 points or more

Simulated Impact on the Detention Population

The current risk assessment process permits staff to override the RAI score so that a detention decision other than that suggested by the score can be imposed. For example, a youth scoring 10 points would normally be eligible for conditional release, but if one of the various mandatory or discretionary override categories applied, the youth may have been detained. The County's override practices will have a major impact on the implementation of the new RAI instrument. However, an analysis of the use and impact of overrides was beyond the scope of this research. As a result, the simulations below focus narrowly on the RAI score. In March 2007, the County began to restructure the override policy and the guidelines surrounding how overrides can be used. When the process has been completed, the intersection of the new override policy and the new RAI must be studied.

Once the item weights and cut points were determined, the impact of the new RAI on the study population (n=3,945 episodes) was simulated to assess the magnitude of changes in the size of the detention population. Table 16, below, shows that compared to the original RAI, the new RAI would decrease the number of youth scoring in the Detain category from 25% of cases to 15% of cases. Many of these cases

would instead score in the Conditional Release category, which under the new RAI accounts for 58% of the cases, as compared to only 27% under the original RAI. Finally, the proportion of cases that would score in the Unconditional Release category would decrease from 47% to 27% under the new RAI.

Table 16. Distribution Across Decision Categories, Original RAI vs. Recommended RAI				
Decision Category	**Original RAI**		**Recommended RAI**	
	N=3,945	%	N=3,945	%
Unconditional Release	1,868	47	1,052	27
Conditional Release	1,081	27	2,296	58
Detain	996	25	597	15

Thus, by score alone, the new RAI will expand the number of youth in the conditional release category significantly. Depending on how the subcommittee decides to restructure the use of overrides, the new RAI may also significantly decrease the number of youth who are detained. Table 17, below, compares the original scored RAI category to the newly scored RAI category in order to illustrate how the major shifts described above would occur.

Table 17. Original RAI versus New RAI, Scored Decision Category					
SCORED Category	Original RAI				Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	924 23%	104 3%	24 1%	1052 27%
	Conditional	927 23%	779 20%	590 15%	2296 58%
	Detain	17 <1%	198 5%	382 10%	597 15%
Total		1868 47%	1081 27%	996 25%	3,945 100%

The shaded cells along the diagonal represent those episodes in which the detention decision would not change between the original RAI and new RAI. These include approximately 53% of all episodes in the study population. The unshaded cells represent those episodes that would change:

- [under the diagonal] For about 29% of the episodes (n=1,142), the new RAI would score them into a more restrictive category than the original RAI. About 80% of these would move from Unconditional to Conditional Release. Only about 2% would move from Unconditional Release to Detention, and about 17% would move from Conditional Release to Detention.

- [above the diagonal] For about 19% of the episodes (n=718), the new RAI would score them into a less restrictive category than the original RAI. About 80% of these would move from Detention to Conditional Release. Only about 3% would move from Detention to Unconditional Release, and about 14% would move from Conditional to Unconditional Release.

As shown in the tables below, similar results were obtained when the study population was split by gender and ethnicity. More specifically, approximately equal proportions of male and female youth, and youth of different ethnicities, would be scored into the Unconditional Release, Conditional Release and Detention categories.

Table 18. New RAI vs Scored Decision Category, Males versus Females

Decision Category	Males		Females	
	N=3,121	%	N=824	%
Unconditional Release	801	26	251	31
Conditional Release	1,863	60	433	53
Detain	457	15	140	17

Table 19. New RAI Scored Decision Category, by Ethnicity

Decision Category	White		Black		Hispanic	
	N=1649	%	N=1603	%	N=440	%
Unconditional Release	442	27	395	25	147	33
Conditional Release	970	59	906	57	255	58
Detain	237	14	302	19	38	9

Additional analyses were conducted to locate the source of these changes, and patterns similar to those illustrated by Table 17 were reveals across all gender and ethnicity subpopulations (these tables are available in the Appendix to this report).

CONCLUSIONS AND RECOMMENDATIONS

The validation proved successful on several levels:

- A robust set of risk factors with statistically significant relationships to the outcomes variables (FTA and new law violations) were identified.
- This set of factors is able to classify youth of both genders and all ethnicities into groups that are internally similar, yet pose different risks of FTA/reoffending.
- The set of risk factors has been streamlined. The original RAI utilized 21 risk factors, while the validated RAI uses only 6, four of which can be auto-scored by the County's information system.
- The validated RAI does not exacerbate the County's continued challenges related to disproportionate minority overrepresentation.
- Depending on how the override policy is restructured, the validated RAI may lead to continued decreases in the use of expensive secure detention resources without jeopardizing public safety, which remains the primary mission of the County's detention reform initiative.

Although the validation effort was successful, additional steps are needed to ensure the validated RAI is properly implemented and to assess its impact on the County's detention practices over time. These efforts include:

- Continue efforts to develop buy-in for the validated RAI instrument among all stakeholders including DCJ administrators and managers, Probation staff, Juvenile Hall staff, judges, prosecutors, defense attorneys, police, and others with a specific interest in how the County utilized detention resources.

- Automate the validated RAI to permit autoscoring of those items for which the required information is already maintained by JJIS.

- Develop a user's manual and train staff accordingly.

- Complete restructuring of the override policy. Re-train staff on which mandatory and discretionary overrides are permitted and the process for invoking them. Require supervisory approval of all overrides to the detention decision suggested by the RAI score.

- Once the new override policy is finalized, pilot test the validated RAI for a period of time to ascertain its overall impact on the detention population and the proportion of youth released both conditionally and unconditionally.

- If the Conditional Release population expands as predicted, ensure sufficient capacity is available to adequately supervise these youth. Conduct research to determine which conditional release options work best for which types of youth and require fidelity to this research when making release decisions.

- Track the FTA/recidivism rates of youth who are released to the community under the direction of the validated RAI. Discuss with stakeholder groups whether these failure rates are acceptable and make adjustments to the scale cut points if needed.

Appendix 1. Materials Presented to Juvenile Justice Coordinating Council: Phase I

Purpose
The RAI is used to guide decisions about who is admitted to detention. The RAI uses a constellation of seven factors to derive a score that is thought to be associated with the youth's risk to public safety. More specifically, higher scores are thought to indicate a higher risk of failing to appear (FTA) for subsequent court dates OR a higher risk to commit a new law violation pending adjudication. Youth who score 12 or more points on the RAI are detained; those scoring between 7 and 11 points are released conditionally; and youth scoring 6 or fewer points are released unconditionally. There are also a set of overrides and special detention cases which automatically detain the youth. The items on the RAI have never been validated using empirical data. That is, the items on the RAI have never been tested to determine their relationship to the youths' rates of FTA or re-offending. This validation is essential for sound correctional practice.

Findings
The results of the analysis of each item on the RAI are presented below. When appropriate, comments are included about any disparate impact across gender or race. *Reading the Tables* **B stands for the Beta coefficient**. A positive B means that the item is positively related to FTA/new offense. In other words, as the score goes up, the risk for FTA/new offense goes up. This is the assumption that is made for most of the items on the RAI—a higher score would indicate the youth should be detained. A negative B means that the item goes the wrong direction. In other words, a higher score means the youth is *less likely* to FTA/commit new offense. So, for all of the items, we want a positive B coefficient. **Sig. stands for the statistical significance**. We want items that are significant at the 0.01 level for maximum certainty. **Exp(B) stands for the Exponentiated B**. It is a measure of the size of the effect. Bigger is better. A short hand way to look at this is to take the numbers following the decimal point and view them as a percentage. That number represents the likelihood of failure for a 1-point change in the score. For example, 1.350 would interpret to: for every one point change in the score on the item, a youth is 35% more likely to FTA/reoffend. If compared to a 1.200, in which a youth would be 20% more likely to fail, the first item would be the stronger one. So, we want items with a bigger Exp(B).

1. Most Serious Instant Offense

This item awards a greater number of points for offenses that are more serious. In other words, the thought is that present behavior may predict future behavior. Therefore, it would follow that youth who are admitted on more serious offenses may be more likely to commit a serious offense in the future.

Item	B	Sig.	Exp(B)
Most Serious Instant Offense	-0.102	0.000	0.903

The relationship is significant (0.000), but the negative B indicates that the item is operating in the wrong direction with regard to the likelihood of FTA/committing new offense. As the number of points on this item goes up, the likelihood of failure goes down. In other words, it suggests that you detain kids who would not FTA/commit new offense, and suggests that you release kids who would FTA/commit new offense. It is hurting the instrument.

Analysis by Gender and Race: the same pattern was found for all groups—youth who scored more points on this item were LESS LIKELY to FTA/commit new offense.

2. Additional Current Offenses

As a matter of practice, this variable is not used. It was scored in only 4 of the 1,394 events. Therefore, it cannot be analyzed.

3. Legal Status

This is a composite item, meaning it has multiple variables that combine to form the Legal Status score.

Item	B	Sig.	Exp(B)
Legal Status—Original ▪ Currently Under Supervision ▪ Felony Violence/Asslt/DV/Firearm ▪ Most Serious Pending Offense ▪ On Conditional Release	0.313	0.000	1.368

All of the variables were significant, EXCEPT for Conditional Release (analysis not shown). Using the shorthand version of the Exp(B), we can see that for every 1-point increase in score, youth are 37% more likely to FTA/commit new offense.

Analysis by Gender and Race: Current item is significant and in the right direction for males and females, and for white and black youth. It is not significant for Hispanic youth, but it does operate in the right direction.

We constructed several variations to this item to see if we could find better results using fewer variables. These results are presented below:

Item	B	Sig.	Exp(B)
Legal Status—Option 2 ▪ Currently Under Supervision ▪ Felony Violence/Asslt/DV/Firearm ▪ Most Serious Pending Offense	0.312	0.000	1.366

[Above: Given the poor relationship on the Most Serious Instant Offense, this could be a place to address the seriousness of the youth's criminal behavior, because the Felony Violence/Asslt/DV/Firearm goes in the right direction]

Item	B	Sig.	Exp(B)
Legal Status—Option 3 ▪ Currently Under Supervision ▪ Most Serious Pending Offense	0.310	0.000	1.364

[Above: You get approximately the same results with this option, and it uses only 2 of the 4 variables currently comprising the item.]

Analysis by Gender and Race: the item above was the strongest across both genders and all races. Though still not significant for Hispanic youth, it does operate in the right direction. Although not as strong for females as males, it is the best of the constellation of Legal Status variables.

Item	B	Sig.	Exp(B)
Legal Status—Option 4 ▪ Felony Violence/Asslt/DV/Firearm ▪ Most Serious Pending Offense	0.236	0.000	1.267

[Above: This one not as good. Need Currently Under Supervision on there.]

Item	B	Sig.	Exp(B)
Legal Status—Option 4 ▪ Currently Under Supervision	0.266	0.000	1.305

Item	B	Sig.	Exp(B)
Legal Status—Option 5 ▪ Most Serious Pending Offense	0.226	0.000	1.253

[Above: both of these are decent on their own, but not as strong as Options 2 and 3. The tradeoff is having a stronger Exp(B) valued versus having additional items that need to be scored]

4. Warrants History.

This item awards points for each warrant (excluding traffic and dependency) during the past 18 months.

Item	B	Sig.	Exp(B)
Warrants History	0.175	0.000	1.191

This variable is significant. We'll come back to it later.

Analysis by Gender and Race: This variable is not significant for females or for Hispanic youth. It is operating in the right direction, and is not penalizing them, but it is not particularly useful.

5. Prior Sustained Offense

This item awards points for each prior sustained offense. More points awarded for felony than misdemeanor.

Item	B	Sig.	Exp(B)
Prior Sustained Offense	0.233	0.000	1.263

This variable is significant. We'll come back to it later.

Analysis by Gender and Race: This variable is not significant for females or for Hispanic youth. It is operating in the right direction, and is not penalizing them, but it is not particularly useful.

6. Mitigating Factors

This is a composite item, meaning it has multiple variables that combine to form the Mitigating Factors score.

Item	B	Sig.	Exp(B)
Mitigating Factors—Original ▪ School/Employed ▪ Responsible Adult ▪ No Referrals past year ▪ First Referral Age 16+ ▪ Instant Offense is First Referral ▪ Not on Probation ▪ No FTA Warrant History	0.267	0.000	1.306

All of the variables were significant, EXCEPT for Not on Probation and No FTA Warrant History (analysis not shown). These two variables scored in the wrong direction as well, which is dragging down the usefulness of the Mitigating Factors item. Strongly recommend that they be dropped from the RAI. Using the shorthand version of the Exp(B), we can see that for every 1-point increase in score, youth are 31% more likely to FTA/commit new offense.

We constructed several variations to this item to see if we could find better results using fewer variables. Essentially, we successively dropped the weakest items from the constellation of variables. These results are presented below:

Item	B	Sig.	Exp(B)
Mitigating Factors—Option 2 ▪ School/Employed ▪ Responsible Adult ▪ No Referrals past year ▪ First Referral Age 16+ ▪ Instant Offense is First Referral	0.344	0.000	1.411

[Above: Removing the two sub-variables that scored in the wrong direction increases the Exp(B) from 31% to 41%.]

Item	B	Sig.	Exp(B)
Mitigating Factors—Option 3 ▪ School/Employed ▪ No Referrals past year ▪ First Referral Age 16+ ▪ Instant Offense is First Referral	0.383	0.000	1.467

[Above: You get even better results with this option, and it uses only 4 sub-variables currently on the instrument]

Item	B	Sig.	Exp(B)
Mitigating Factors—Option 4 ▪ School/Employed ▪ First Referral Age 16+ ▪ Instant Offense is First Referral	0.368	0.000	1.445

[Above: the above two are very similar—46% versus 45%. The question is how much work is involved in tracking the number of referrals in the past year? Is it worth a 1% difference?]

Analysis by Gender and Race: The item above was the strongest for males, whites, and Hispanics. It was not as strong for females and black youth, but still among the top choices.

Item	B	Sig.	Exp(B)
Mitigating Factors—Option 5 ▪ First Referral Age 16+ ▪ Instant Offense is First Referral	0.350	0.000	1.419

[Above: this one is virtually indistinguishable in terms of power from Option 2. However, given that Option 2 includes 5 variables, and this one only has 2, this one would be far more efficient.]

Item	B	Sig.	Exp(B)
Mitigating Factors—Option 6 ▪ Instant Offense is First Referral	0.298	0.000	1.348

Item	B	Sig.	Exp(B)
Mitigating Factors—Option 7 ▪ First Referral Age 16+	0.259	0.000	1.296

[Above: both of these are decent on their own, but not as strong as other options. The tradeoff is having a stronger Exp(B) valued versus having additional items that need to be scored]

7. Aggravating Factors

This is a composite item, meaning it has multiple variables that combine to form the Aggravating Factors score.

Item	B	Sig.	Exp(B)
Aggravating Factors—Original ▪ No Community Ties ▪ Possession of Firearm ▪ Runaway—Home and Placement ▪ Runaway—Placement Only ▪ Multiple Victims ▪ Threats to Victim/Witnesses	0.082	0.050	1.086

The score for the composite item, Aggravating Factors, was not significant at the .01 level. Two of the sub-variables, No Community Ties and Possession of Firearm operate in the wrong direction. Strongly recommend that these two be dropped from the RAI. Of the remaining 4 variables, only the Runaway variables were significant.

We constructed several variations to this item to see if we could find better results using fewer variables. Essentially, we successively dropped the weakest items from the constellation of variables. For the sake of completeness, we included those that were not significant. These results are presented below:

Item	B	Sig.	Exp(B)
Aggravating Factors—Option 2 ▪ Runaway—Home and Placement ▪ Runaway—Placement Only ▪ Multiple Victims ▪ Threats to Victim/Witnesses	0.063	0.020	1.066

[Above: Although the No Ties and Firearm Possession variables operate in the wrong direction, they are not actually hurting the instrument because they are diluted by the other variables. Compare Exp(B) of 9% with them in, and 7% with them out. Note low percentage change compared to other RAI items.]

Item	B	Sig.	Exp(B)
Aggravating Factors—Option 3 ▪ Runaway—Home and Placement ▪ Runaway—Placement Only ▪ Threats to Victim/Witnesses	0.098	0.000	1.102

[Above: This one is significant but not all that strong compared to other items.]

Item	B	Sig.	Exp(B)
Aggravating Factors—Option 4 ▪ Runaway—Home and Placement ▪ Runaway—Placement Only	0.133	0.000	1.143

[Above: A bit stronger still, although probably confusing to have two Runaway items.]

Item	B	Sig.	Exp(B)
Aggravating Factors—Option 5 ▪ Possession of Firearm ▪ Runaway—Home and Placement	0.094	0.022	1.099
*this Option was constructed to see if an item using the Firearm variable could be developed. Unlike the others, it includes items that were not significant when tested alone.			

Item	B	Sig.	Exp(B)
Aggravating Factors—Option 6 ▪ Runaway—Home and Placement	0.165	0.000	1.179

Item	B	Sig.	Exp(B)
Aggravating Factors—Option 7 ▪ Runaway—Placement Only	0.085	0.046	1.089

[Above: Runaway—Home and Placement is the stronger of the two Runaway sub-variables and is the strongest option overall. Note that still not all that powerful in the whole scheme of things.]

Analysis by Gender and Race: Using both Runaway items together works okay for all groups, as does using just Runaway—Home and Placement. Recommend using just Runaway—Home and Placement because the effect sizes are comparable across all groups and it will streamline the instrument.

Overall Score

The overall score is derived by adding the points awarded/subtracted on the 7 RAI items. It is comprised of the following items and sub-variables:

Item	B	Sig.	Exp(B)
Overall Score—Original Most Serious Instant Offense Additional Current Offense Legal Status—Original ▪ Currently Under Supervision ▪ Felony Violence/Asslt/DV/Firearm ▪ Most Serious Pending Offense ▪ On Conditional Release Warrants History Prior Sustained Offense Mitigating Factors—Original ▪ School/Employed ▪ Responsible Adult ▪ No Referrals past year ▪ First Referral Age 16+ ▪ Instant Offense is First Referral ▪ Not on Probation ▪ No FTA Warrant History Aggravating Factors—Original ▪ No Community Ties ▪ Possession of Firearm ▪ Runaway—Home and Placement ▪ Runaway—Placement Only ▪ Multiple Victims ▪ Threats to Victim/Witnesses	0.271	0.000	1.311

Given the poor results for the Most Serious Instant Offense item and the lack of utility of the Additional Current Offenses item, we used the remaining 5 RAI items in multiple constellations to identify that with the strongest relationship to the risk of FTA/new offense. Option 2, below, uses fewer items, and comparison of the Exp(B) reveals 44% versus 31% on the original.

Item	B	Sig.	Exp(B)
Overall Score—Option 2 Legal Status—Option 3 ▪ Currently Under Supervision ▪ Most Serious Pending Offense Warrants History Prior Sustained Offense Mitigating Factors—Option 3 ▪ School/Employed ▪ No Referrals past year ▪ First Referral Age 16+	0.361	0.000	1.435

▪ Instant Offense is First Referral Aggravating Factors—Option 4 ▪ Runaway—Home and Placement ▪ Runaway—Placement Only			

Option 3 removes the Aggravating Factors item altogether. Exp (B) comparison is 41% versus 44% for Option 2 .

Item	B	Sig.	Exp(B)
Overall Score—Option 3 Legal Status—Option 3 ▪ Currently Under Supervision ▪ Most Serious Pending Offense Warrants History Prior Sustained Offense Mitigating Factors—Option 3 ▪ School/Employed ▪ No Referrals past year ▪ First Referral Age 16+ ▪ Instant Offense is First Referral	0.341	0.000	1.406

Analysis by Gender and Race: There are literally thousands of combinations that could be used. We conducted additional analyses by race and gender to see if we could identify an constellation of items that was equally strong for both males and females, and across all racial groups.

Item	Group	B	Sig.	Exp(B)
Overall Score—Option 4	Total	0.382	0.000	1.465
Legal Status—Option 3				
▪ Currently Under Supervision	Male	0.382	0.000	1.466
▪ Most Serious Pending Offense	Female	0.326	0.001	1.386
Prior Sustained Offense				
Mitigating Factors—Option 3	White	0.362	0.000	1.436
▪ School/Employed	Black	0.353	0.000	1.423
▪ No Referrals past year	Hispanic	0.338	0.017	1.402
▪ First Referral Age 16+				
▪ Instant Offense is First Referral				

Item	Group	B	Sig.	Exp(B)
Overall Score—Option 5	Total	0.389	0.000	1.476
Legal Status—Option 3				
▪ Currently Under Supervision	Male	0.392	0.00	1.480
▪ Most Serious Pending Offense	Female	0.350	0.00	1.418
Mitigating Factors—Option 3				
▪ School/Employed	White	0.388	0.00	1.474
▪ No Referrals past year	Black	0.347	0.00	1.414
▪ First Referral Age 16+	Hispanic	0.348	0.023	1.417
▪ Instant Offense is First Referral				

Item	Group	B	Sig.	Exp(B)
Overall Score—Option 6	Total	0.398	0.000	1.488
Legal Status—Option 3				
▪ Currently Under Supervision	Male	0.406	0.000	1.501
▪ Most Serious Pending Offense	Female	0.344	0.000	1.410
Mitigating Factors—Option 4				
▪ School/Employed	White	0.405	0.000	1.500
▪ First Referral Age 16+	Black	0.347	0.000	1.415
▪ Instant Offense is First Referral	Hispanic	0.364	0.020	1.439
Aggravating Factors—Option 6				
▪ Runaway—Home and Placement				

These are offered simply as a starting point, to give you a sense of how you could modify the RAI and improve on its relationship to the outcomes you are trying to predict (FTA/new offense). There are many other combinations that could be used. Our recommendation is that you chose among those that use items going in the right direction, reduce workload, and demonstrate a stronger relationship to the outcome variables than the items currently on the RAI.

Additional Analyses

We conducted several additional analyses in anticipation of questions you may have:

1. The "No Community Ties" variable on the Aggravating Factors item was not significant for youth of any race. That is, youth scoring points on this variable were no more or less likely to FTA/commit new offense than those who did not score points on that variable. This was true across white, black, Hispanic and youth of other races.

2. We checked to see if Possession of a Firearm (variable of the Aggravating Factors item) was related to violent re-offending. To do so, we looked to see if youth who scored a point on the Possession of Firearm variable had more serious subsequent law violations than those who did not. The sample was too small for

meaningful analysis. Only 20 youth scored a point on this item, and only 6 of those re-offended.

3. We wanted to look at the Most Serious Instant Offense (MSIO) item from a different angle to see if it could offer us any information about the outside limit of what the kid was capable of. For each category, we looked at the distribution of recidivating offenses to see if those who had a more violent MSIO also had more violent subsequent offenses. We also looked to see if the average severity score associated with subsequent offenses were significantly higher for the MSIO categories at the top of the scale. We did not find either of these to be true—there were no clear patterns among offense severity.

4. We also had sufficient data to test two new variables for consideration for the RAI:
   - Most Serious Allegation in the Past 90 Days
   - Total Number of Allegations in the Past 90 Days

   Using allegations instead of pending offenses would capture the full range of youth behavior and would not be influenced by court practices. However, the Most Serious Allegation variable was not significant, and also operated in the wrong direction in comparison to the relationship to FTA/new offense. The Number of Allegations was significant and operated in the right direction, but comparisons of the Exp(B) statistic revealed it was not as strong as the other Legal Status variables, either alone or in combination (e.g., Exp(B) interpretation 15% versus approximately 35%).

Next Steps

1. The Juvenile Justice Council needs to come to a consensus on which items to use on the new version of the RAI. The options we have presented are data-driven, meaning that they utilize the strongest of the available items. There may be political reasons to suggest other items or combinations of items. To the extent possible, we recommend that you reserve these issues for Overrides so as to not dilute the statistical power of the instrument. That said, feel free to suggest a different constellation of items than what is presented here and we will analyze its relationship to the outcome variables for the group and across gender and race subpopulations.
2. Once the items have been selected, we will tinker with the weights associated with each value and the cut points for the total score that would result in a detain/conditional release/unconditional release decision. We will strive to create groups that are statistically distinct from each other, meaning that the youth who fall into each group have similar rates of FTA/new offense, but the groups are different from each other in terms of the risk of FTA/new offense.
3. Using these weights and cut-points, we will simulate the impact on the detention population by applying the revised instrument to the 3,945 cases that were included in the original sample. This will allow you to assess the impact on detention bedspace and community resources if you put the revised instrument into use.

Methodology

We extracted data from JJIS on all cases that were screened using the RAI between August 2004 and May 2006. There were a total of n=3,945 events in the sample. These events were split into two groups:

- *Detention events:* youth who were detained and therefore were not at risk, meaning they did not have an opportunity to FTA or reoffend. There were n=2,551 events in this group.
- *Community events*: youth who were released to the community pending a preliminary hearing or disposition. There were n=1,394 events in this group. The bulk of the analyses were conducted on this group.

Each of these 1,394 events represents an episode. The starting point of the episode is the youth's being assessed using the RAI and subsequent release to the community. The ending point of the episode is a court date (preliminary hearing or disposition). The outcome of this episode represents the dependent variable, (i.e., the event that the RAI is designed to predict). There are two possibilities:

- *Success*: the youth appeared in court as scheduled
- *Failure*: the youth either failed to appear in court OR had a new law violation while in the community pending court

A hazard analysis was used to determine the relationship between each of the items on the RAI and the dependent variable (i.e., success or failure). A hazard analysis is a multivariate technique commonly used in recidivism studies. It controls for the time at risk and also allows us to examine the relationship between one item on the RAI while controlling the values on all others.

First, we did an analysis of the population as a whole, and then split the population in to subgroups: gender (males and females) and race (white, black, hispanic, other). This analysis allowed us to identify those items on the RAI with the strongest relationship to the risk of FTA/new offense.

Appendix 2. Materials Presented to Juvenile Justice Coordinating Council: Phase II

Purpose

The results of Phase I of the RAI validation study indicated that the following six items, in combination, had the strongest relationship to the youth's risk of recidivism:

- Currently Under Supervision
- Most Serious Pending Offense
- School/Employed
- First Referral at Age 16
- Instant Offense is 1st Offense
- History of Runaway from Home or Placement

This set of factors produced the best results for the population of youth overall and, when split across gender and race, produced solid results for each subpopulation.

The goal of Phase II is to develop a method for scoring the instrument that, based on data, provides for homogenous groups that have different likelihoods of recidivism. In other words, youth scoring into the various categories should be similar to each other, but youth scoring into different categories should have different likelihoods of recidivism. It is important to note that these recommendations are based purely on data—we did not try to mimic the current proportions of youth who are released or detained.

Phase II involved the following tasks:

<u>Building a Scoring Convention</u>

- Determining the proper weight for each item
- Determining the proper cut points for the scale

<u>Simulating the Impact of the New Instrument on the Population</u>

- Comparing the size of the new categories to the old ones, by score alone
- Comparing the size of the new categories to the old ones, accounting for overrides

Reminder: the outcome that we have used all along is recidivism, which was defined as either a new law violation pending the next court date OR a failure to appear for a scheduled court date. Current thinking in the field is moving away from looking at recidivism as a dichotomous variable—meaning as success-failure. Instead, better results are achieved when recidivism is considered to be a continuous variable—meaning looking at the time-to-recidivate. This is why Phase I of this research used the Hazard Analysis, which controls for time at risk. In Phase II, this construction of recidivism means that results are presented not as whether someone recidivated or not, but rather *how long it took* for members of each group to recidivate. Therefore, we can not evaluate the promise of the scoring convention using the typical Type I/Type II errors, but rather must look at whether it produces groups that have significantly different times to recidivate.

Distribution Across Items

The new RAI includes six items, four of which are dichotomous and two of which have multiple levels.The original study population was split into two groups for the purpose of determining the relationship of the items to recidivism—those who were at risk of recidivism (i.e., those who were released to the community=Released) and those who were not at risk of recidivism (i.e., those who were detained pending their next court date=Detained). These distinctions are less important in Phase II as we are describing the impact of the new RAI on the total population, but are shown here for the sake of completeness. Remember that the study sample included 3,945 "episodes", representing each time a youth was scored on the RAI. A single youth is likely to have multiple episodes. These 3,945 total episodes involved 1,468 individual youth at different points in time.

Table 1. Distribution Across Risk Items

Item	Proposed Weight	Total		Detained		Released	
		N=3,945	%	N=2,551	%	N=1,394	%
Currently Under Supervision (score mst serious)							
Parole/Committed to YCF/Probation	2	2094	53	1806	71	288	21
Def Dispo/Acctab Agrmt/Sole Sanction	1	138	4	67	3	71	5
No Formal Supervision	0	1713	43	678	27	1035	74
Most Serious Pending Offense (score mst srus)							
Intentional homicide	17	~	~	~	~	~	~
Att Murder/ A Felony with violence or wpn	12	21	<1	21	1	~	~
B Felony with violence or weapon	8	45	1	34	1	11	1
Rape I/Sod I/Sex Pen I w/out forcible cmpls	7	11	<1	9	<1	2	<1
C Felony with violence or weapon	6	117	3	88	3	29	2
All other A and B felonies	5	195	5	147	6	48	3
All other C felonies/ Misd with viol/weapon	3	451	11	323	13	128	9
All other misdemeanors/PV	1	947	24	758	30	189	14
No pending offense, or status offense only	0	2158	55	1171	46	987	71
Mitigating Factors (score all that apply)							
School/Employed	-3	1126	29	508	20	618	44
First offense at age 16+	-3	280	7	109	4	171	12
Instant offense is 1st offense	-3	376	10	98	4	278	20
Aggravating Factor							
Runaway from home or placement	3	691	18	605	24	86	6

Looking down the Total column, you can see the number/proportion of times that youth scored in the various categories.

- About 40%, not currently under supervision.
- Only about 5% with pending offenses that are violent felonies. About 55% who do not have any pending offenses, or the only ones they do have are status offenses
- About 30% were assessed to be in school/employed (this proportion could increase as procedures around collecting this information improve).
- A little less than 20% have history of runaway from home or placement.

Weights and Scale Cut Points

The first thing we needed to do was develop a scoring convention that was based on some sort of logic—mathematical or otherwise. In some cases, it made sense to keep the scoring convention that existed on the original RAI, providing it was in keeping with the relative strength of the item's relationship to recidivism. [See "Proposed Weight" column in table on page 2.] *Currently Under Supervision* and *Most Serious Pending Offense* fell into this category (there were also logistical reasons for trying to keep the scoring rubric for MSPO the same). Given that so many points could potentially be allocated for MSPO, we didn't want that item to overwhelm the others, so we increased the number of points for the mitigating and aggravating factors accordingly. In addition, the *Mitigating Factors* items were among those with the most powerful relationship to recidivism in Phase I, so giving them more points than *Currently Under Supervision* was logical.

With these weights assigned, the next step was to re-score all of the episodes contained in our original sample so that we could determine appropriate cut points on the scale. The scores ranged from -9 to 17 points. Limiting the number of possible points to award is always preferable because it reduces the frequency of mathematical errors and thereby improves interrater reliability.

Table 2. Distribution of Scores, using New RAI

Total Score	Total		Detained		Released	
	N=3,945	%	N=2,551	%	N=1,394	%
-9	68	2	14	1	54	4
-6	223	6	56	2	167	12
-5	11	<1	1	<1	10	1
-4	8	<1	3	<1	5	<1
-3	400	10	87	3	313	23
-2	51	1	14	1	37	3
-1	291	7	232	9	59	4
0	568	14	248	10	320	23
1	99	3	47	2	52	4
2	573	15	475	19	98	7
3	608	15	462	18	146	11
4	76	2	52	2	24	2
5	372	9	326	13	46	3
6	374	10	330	13	44	3
7	71	2	64	3	7	1
8	98	3	87	3	11	1
9	14	<1	14	1	~	~
10	15	<1	14	1	1	<1
11	5	<1	5	<1	~	~
12	12	<1	12	1	~	~
14	6	<1	6	<1	~	~
15	1	<1	1	<1	~	~
17	1	<1	1	<1	~	~

Once we had a logical scoring convention, we needed to figure out where the cut points should be for each of the decision categories (unconditional release, conditional release and detain). As mentioned earlier, the outcome we have used throughout this analysis is recidivism (either FTA or new offense), or more specifically, time-to-recidivism. As opposed to a dichotomous variable where you would say, "offenders in the unconditional release group had a 30% failure rate, whereas offenders in the conditional release group had a 45% failure rate," using a continuous variable means that we must compare the length of time to recidivism—with longer times being better, of course. It is essential to remember that structured decision making is not about prediction, it is about classification. None of the instruments in use can predict how a specific offender will behave. Instead, they can only classify offenders into groups that are likely to behave in a certain way. The goal is to get the offender in the right group, not to predict individual behavior.

Determining the cut-points for the various decision categories required searching for the point in the distribution of scores at which the time to recidivism changed markedly. All of the "release" episodes from our original data set were rescored using the new RAI, and their time to recidivism was analyzed. The table below shows the cut points that resulted in the most homogeneous groups with the greatest difference from each other. Placing the cut points at less than zero, zero to 5, and 6 or more points produced groups with significantly different times to recidivism. Note that the Original RAI produced time-to-recidivism averages that are not linear and that do not have good separation.

Table 3. Days to Recidivism, by Detention Decision, Old and New

Detention Decision	**Original RAI** Range -9 to 74 points	**New RAI** Range -9 to 22 points
Unconditional Release	142 days (6 points or less)	171 days (Less than 0 points)
Conditional Release	75 days (7 to 11 points)	92 days (0 to 5 points)
Detain	97 days* (12 points or more)	55 days (6 points or more)
these youth scored in the detain category, but were overridden to the release category, thus their time at risk could be calculated		

A couple comments about the other tables in this light:

- In Table 2, you can see the range and number of episodes with each score falling into each category
- Setting the cut point for Detain at 6 points had another effect that we didn't plan initially, but believe to be a good thing: Looking at Table 1, you can see that all felony offenses with violence or weapon score at least 6 points, meaning that there will be a presumption of detention for offenders with these types of pending offenses.

Simulating the Impact on the Detention Population

Once the item weights and cut points were determined, we wanted to simulate the impact of the new RAI on the study population (n=3,945 episodes) to assess the magnitude of changes in the size of the detention population.

Table 4. Distribution Across Decision Categories, Old versus New, Scored versus Overridden

Decision Category	Original RAI (scored)		New RAI (scored)		Original RAI (overrides)		New RAI (overrides)	
	N=3,945	%	N=3,945	%	N=3,945	%	N=3,945	%
Unconditional Release	1,868	47	1,052	27	847	21	816	21
Conditional Release	1,081	27	2,296	58	605	15	2158	55
Detain	996	25	597	15	2493	63	971	25

Looking at the impact of the RAI going on score alone (not considering any overrides), the new RAI would reduce the number of episodes resulting in detention by about 399 youth (about 40%). The new RAI would also increase the number of youth placed on conditional release by about 1,215 (about 112%). The number of youth released unconditionally would decrease by about 816 (about 44%).

But, remember that overrides, as they are currently used, have a major impact on the detention decision. With overrides, you detain far more youth than you would based on score alone (overrides result in 1,497 more youth being detained than the score would suggest—a 150% increase). As a result, the scenario changes considerably if we account for the overrides in looking at the detention decision. First of all, if the new RAI is used and assuming nothing changes in how overrides are used (big assumption), the number of youth detained will be significantly lower than with the original RAI (Instead of 63% detention rate, it would drop to 25%). In other words, the number of youth detained would decrease by approximately 1,522 (about 61%). Further, using the new RAI with the same override patterns, the number of youth in the unconditional release category would decrease by 31 (about 4%), but the number of youth in the conditional release category would increase by 1,553 youth (about 257%).

Regardless of the scenario used, the new RAI will expand the number of youth in the conditional release category significantly. Depending on how the subcommittee decides to restructure the use of overrides, the new RAI may also significantly decrease the number of youth who are detained.

To illustrate where these youth would be drawn from, the table below compares their original category to the category indicated by the new RAI.

Table 5. Original RAI versus New RAI, Scored Decision Category

SCORED Category		Original RAI			Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	924 23%	104 3%	24 1%	1052 27%
	Conditional	927 23%	779 20%	590 15%	2296 58%
	Detain	17 <1%	198 5%	382 10%	597 15%
Total		1868 47%	1081 27%	996 25%	3,945 100%

The shaded cells along the diagonal represent those episodes in which the detention decision would not change between the original RAI and new RAI. These include approximately 53% of all episodes in the study population. The unshaded cells represent those episodes that do change:

- [under the diagonal] For about 29% of the episodes (n=1,142), the new RAI scores them into a more restrictive category than the original RAI. About 80% of these are from unconditional to conditional release. Only about 2% go from unconditional to detain, and about 17% go from conditional to detain.
- [above the diagonal] For about 19% of the episodes (n=718), the new RAI scores them into a less restrictive category than the original RAI. About 80% of these are from detain to conditional release. Only about 3% go from detain to unconditional release, and about 14% go from conditional to unconditional release.

As you know, the detention decision suggested by the score on the RAI is often overridden using a variety of special considerations, court orders, legislative or policy overrides. Thus, we need to look at how the application of overrides would affect these proportions. Assuming that the same overrides are in effect for the new RAI, considering the role of overrides gives a different picture than that discussed above.

Table 6. Original RAI versus New RAI, Overridden Decision Category

OVERRIDEN Category		Original RAI			Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	481 12%	24 1%	311 8%	816 21%
	Conditional	363 9%	522 13%	1273 32%	2158 55%
	Detain	3 <1%	59 2%	909 23%	971 25%
Total		847 21%	605 15%	2493 63%	3,945 100%

Again, the shaded cells along the diagonal represent those episodes in which the detention decision would not change between the original RAI and new RAI once overrides are applied. These include approximately 48% of all episodes in the study population (so the new RAI has a slightly bigger impact on the detention decision once the overrides are considered). The unshaded cells represent those episodes that do change:

- [under the diagonal] For about 12% of the episodes (n=425), the new RAI scores them into a more restrictive category than the original RAI. About 85% of these are from unconditional to conditional release. Only about 1% go from unconditional to detain, and about 14% go from conditional to detain.
- [above the diagonal] For about 41% of the episodes (n=1,608), the new RAI scores them into a less restrictive category than the original RAI. About 79% of these are from detain to conditional release. Only about 19% go from detain to unconditional release, and about 1% go from conditional to unconditional release.

Next Steps For the Juvenile Justice Council and the Department of Community Justice

1. Identify a few key questions to assess the impact of the new RAI on detention rates of minority youth.
2. Assess the capacity of the County's conditional release options to determine if the numbers anticipated under the new RAI are even feasible.
3. Examine the use of overrides and determine which types will be imposed and what limits will apply.
4. Pilot test the new instrument for a period of time to determine the precise impact of the overrides and the performance of those who are released, both conditionally and unconditionally, under the new RAI.

Appendix 3. Materials Presented to Juvenile Justice Coordinating Council: Phase III

Review and Purpose of Today's Presentation

The results of Phase I of the RAI validation study indicated that the following six items, in combination, had the strongest relationship to the youth's risk of recidivism:

- Currently Under Supervision
- Most Serious Pending Offense
- School/Employed
- First Referral at Age 16
- Instant Offense is 1st Offense
- History of Runaway from Home or Placement

This set of factors produced the best results for the population of youth overall and, when split across gender and race, produced solid results for each subpopulation. Last month, I showed you a proposed scoring convention that was practical and reflected the relative strength of each of the item to the overall instrument. That convention is as follows:

Table 1. Scoring Convention for New RAI

Item	Proposed Weight
Currently Under Supervision (score mst serious)	
Parole/Committed to YCF/Probation	2
Def Dispo/Acctab Agrmt/Sole Sanction	1
No Formal Supervision	0
Most Serious Pending Offense (score mst srus)	
Intentional homicide	17
Att Murder/ A Felony with violence or wpn	12
B Felony with violence or weapon	8
Rape I/Sod I/Sex Pen I w/out forcible cmpls	7
C Felony with violence or weapon	6
All other A and B felonies	5
All other C felonies/ Misd with viol/weapon	3
All other misdemeanors/PV	1
No pending offense, or status offense only	0
Mitigating Factors (score all that apply)	
School/Employed	-3
First offense at age 16+	-3
Instant offense is 1st offense	-3
Aggravating Factor	
Runaway from home or placement	3

When applied to the sample of records that we used for the study, the new instrument and scoring convention created the following populations:

Table 2. Scored Decision Category, Original RAI versus New RAI				
Decision Category	Original RAI (scored)		New RAI (scored)	
	N=3,945	%	N=3,945	%
Unconditional Release	1,868	47	1,052	27
Conditional Release	1,081	27	2,296	58
Detain	996	25	597	15

In general, the new RAI creates significant increases in the number of episodes that would result in conditional release, while reducing the number of episodes that would result in detention and that would result in unconditional release.

Table 3. Original RAI versus New RAI, Scored Decision Category					
SCORED Category	Original RAI				Total
New RAI		Unconditional	Conditional	Detain	
	Unconditional	924 23%	104 3%	24 1%	1052 27%
	Conditional	927 23%	779 20%	590 15%	2296 58%
	Detain	17 <1%	198 5%	382 10%	597 15%
Total		1868 47%	1081 27%	996 25%	3,945 100%

The shaded cells along the diagonal represent those episodes in which the detention decision would not change between the original RAI and new RAI. These include approximately 53% of all episodes in the study population. The unshaded cells represent those episodes that do change:

- [under the diagonal] For about 29% of the episodes (n=1,142), the new RAI scores them into a more restrictive category than the original RAI. About 80% of these are from unconditional to conditional release. Only about 2% go from unconditional to detain, and about 17% go from conditional to detain.
- [above the diagonal] For about 19% of the episodes (n=718), the new RAI scores them into a less restrictive category than the original RAI. About 80% of these are from detain to conditional release. Only about 3% go from detain to unconditional release, and about 14% go from conditional to unconditional release.

The question at hand was whether the new RAI would produce equitable results across gender and across the major ethnic subpopulations.

Results by Gender

The tables below demonstrate that, using the new RAI, approximately equal portions of male and female youth would be scored into the unconditional release, conditional release and detained categories.

Table 4. New RAI vs Scored Decision Category, Males versus Females

Decision Category	Males		Females	
	N=3,121	%	N=824	%
Unconditional Release	801	26	251	31
Conditional Release	1,863	60	433	53
Detain	457	15	140	17

The tables below examine the source of these changes:

Table 5. New RAI versus Original RAI Comparison, by Gender

Male

SCORED Category		Original RAI			Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	703 23%	79 3%	19 1%	801 26%
	Conditional	724 23%	646 21%	493 16%	1,863 60%
	Detain	13 <1%	138 4%	306 10%	457 15%
Total		1,440 46%	863 28%	818 26%	3,121 100%

Female

SCORED Category		Original RAI			Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	221 27%	25 3%	5 1%	251 30%
	Conditional	203 25%	133 16%	97 12%	433 53%
	Detain	4 <1%	60 7%	76 9%	140 17%
Total		428 52%	218 26%	178 22%	824 100%

For Males:

- The scored decision category DOES NOT CHANGE for 54% of all episodes in the study population.
- [under the diagonal] For about 28% of the episodes (n=875), the new RAI scores them into a more restrictive category than the original RAI. About 83% of these are from unconditional to conditional release. Only about 2% go from unconditional to detain, and about 16% go from conditional to detain.
- [above the diagonal] For about 19% of the episodes (n=591), the new RAI scores them into a less restrictive category than the original RAI. About 83% of these are from detain to conditional release. Only about 3% go from detain to unconditional release, and about 14% go from conditional to unconditional release.

For Females:

- The scored decision category DOES NOT CHANGE for 52% of all episodes in the study population.
- [under the diagonal] For about 32% of the episodes (n=267), the new RAI scores them into a more restrictive category than the original RAI. About 76% of these are from unconditional to conditional release. Only about 2% go from unconditional to detain, and about 22% go from conditional to detain.
- [above the diagonal] For about 16% of the episodes (n=127), the new RAI scores them into a less restrictive category than the original RAI. About 76% of these are from detain to conditional release. Only about 4% go from detain to unconditional release, and about 20% go from conditional to unconditional release.

Results by Ethnicity

The tables below demonstrate that, using the new RAI, approximately equal portions of youth of different ethnicities would be scored into the unconditional release, conditional release and detained categories. (Differences are not statistically significant)

Table 6. New RAI Scored Decision Category, by Ethnicity

Decision Category	White		African-American		Hispanic	
	N=1649	%	N=1603	%	N=440	%
Unconditional Release	442	27	395	25	147	33
Conditional Release	970	59	906	57	255	58
Detain	237	14	302	19	38	9

The tables below examine the sources of these changes:

Table 7. Original RAI versus New RAI, Scored Decision Category, by Race

White

SCORED Category		Original RAI			Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	400 24%	35 2%	7 <1%	442 27%
	Conditional	424 26%	314 19%	232 14%	970 59%
	Detain	9 1%	81 5%	147 9%	237 14%
Total		833 51%	430 26%	386 23	1,649 100%

African-American

SCORED Category		Original RAI			Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	333 21%	49 3%	13 1%	395 25%
	Conditional	346 22%	310 19%	250 16%	906 57%
	Detain	6 <1%	93 6%	203 13%	302 19%
Total		685 43%	452 28%	466 29%	1,603 100%

Hispanic

SCORED Category		Original RAI			Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	125 28%	18 4%	4 1%	147 33%
	Conditional	97 22%	91 21%	67 15%	255 58%
	Detain	2 <1%	16 4%	20 5%	38 9%
Total		224 51%	125 28%	91 21%	440 100%

For White Youth:

- The scored decision category DOES NOT CHANGE for 52% of all episodes in the study population.
- [under the diagonal] For about 31% of the episodes (n=514), the new RAI scores them into a more restrictive category than the original RAI. About 82% of these are from unconditional to conditional release. Only about 2% go from unconditional to detain, and about 16% go from conditional to detain.
- [above the diagonal] For about 17% of the episodes (n=274), the new RAI scores them into a less restrictive category than the original RAI. About 85% of these are from detain to conditional release. Only about 3% go from detain to unconditional release, and about 13% go from conditional to unconditional release.

For Black Youth:

- The scored decision category DOES NOT CHANGE for 53% of all episodes in the study population.
- [under the diagonal] For about 28% of the episodes (n=445), the new RAI scores them into a more restrictive category than the original RAI. About 78% of these are from unconditional to conditional release. Only about 1% go from unconditional to detain, and about 21% go from conditional to detain.
- [above the diagonal] For about 19% of the episodes (n=312), the new RAI scores them into a less restrictive category than the original RAI. About 80% of these are from detain to conditional release. Only about 4% go from detain to unconditional release, and about 16% go from conditional to unconditional release.

For Hispanic Youth:

- The scored decision category DOES NOT CHANGE for 54% of all episodes in the study population.
- [under the diagonal] For about 26% of the episodes (n=115), the new RAI scores them into a more restrictive category than the original RAI. About 84% of these are from unconditional to conditional release. Only about 2% go from unconditional to detain, and about 14% go from conditional to detain.
- [above the diagonal] For about 20% of the episodes (n=89), the new RAI scores them into a less restrictive category than the original RAI. About 75% of these are from detain to conditional release. Only about 5% go from detain to unconditional release, and about 20% go from conditional to unconditional release.

Appendix 4. Materials Presented to DCJ Probation Counselors

Purpose of the Study:

The RAI is used to guide decisions about who is admitted to detention. The RAI uses a constellation of seven factors to derive a score that is thought to be associated with the youth's risk to public safety. More specifically, higher scores are thought to indicate a higher risk of failing to appear (FTA) for subsequent court dates OR a higher risk to commit a new law violation pending adjudication. Youth who score 12 or more points on the RAI are detained; those scoring between 7 and 11 points are released conditionally; and youth scoring 6 or fewer points are released unconditionally. There are also a set of overrides and special detention cases which automatically detain the youth.

The items on the RAI had never been validated using empirical data. That is, the items on the RAI had never been tested to determine their relationship to the youths' rates of FTA or re-offending. These relationships are presented in the tables below. Reading the tables:

- **B stands for the Beta coefficient**. A positive B means that the item is positively related to FTA/new offense. In other words, as the score goes up, the risk for FTA/new offense goes up. This is the assumption that is made for most of the items on the RAI—a higher score would indicate the youth should be detained. A negative B means that the item goes the wrong direction. In other words, a higher score means the youth is *less likely* to FTA/commit new offense. So, for all of the items, we want a positive B coefficient.

- **Sig. stands for the statistical significance**. We want items that are significant at the 0.01 level for maximum certainty.

- **Exp(B) stands for the Exponentiated B**. It is a measure of the size of the effect. Bigger is better. A short hand way to look at this is to take the numbers following the decimal point and view them as a percentage. That number represents the likelihood of failure for a 1-point change in the score. For example, 1.350 would interpret to: for every one point change in the score on the item, a youth is 35% more likely to FTA/reoffend. If compared to a 1.200, in which a youth would be 20% more likely to fail, the first item would be the stronger one. So, we want items with a bigger Exp(B).

1. Most Serious Instant Offense

This item awards a greater number of points for offenses that are more serious. In other words, the thought is that present behavior may predict future behavior. Therefore, it would follow that youth who are admitted on more serious offenses may be more likely to commit a serious offense in the future.

Item	B	Sig.	Exp(B)
Most Serious Instant Offense	-0.102	0.000	0.903

The relationship is significant (0.000), but the negative B indicates that the item is operating in the wrong direction with regard to the likelihood of FTA/committing new offense. As the number of points on this item goes up, the likelihood of failure goes down. In other words, it suggests that you detain kids who would not FTA/commit new offense, and suggests that you release kids who would FTA/commit new offense. It is hurting the instrument.

2. Additional Current Offenses

As a matter of practice, this variable is not used. It was scored in only 4 of the 1,394 events. Therefore, it cannot be analyzed.

3. Legal Status

This is a composite item, meaning it has multiple variables that combine to form the Legal Status score.

Item	B	Sig.	Exp(B)
Legal Status—Original ▪ Currently Under Supervision ▪ Felony Violence/Asslt/DV/Firearm ▪ Most Serious Pending Offense ▪ On Conditional Release	0.313	0.000	1.368

All of the variables were significant, EXCEPT for Conditional Release (analysis not shown). Using the shorthand version of the Exp(B), we can see that for every 1-point increase in score, youth are 37% more likely to FTA/commit new offense.

We constructed several variations to this item to see if we could find better results using fewer variables. These results are presented below. You get approximately the same results as the original with this option, and it uses only 2 of the 4 variables currently comprising the item.

Item	B	Sig.	Exp(B)
Legal Status—Option 3 ▪ Currently Under Supervision ▪ Most Serious Pending Offense	0.310	0.000	1.364

4. Warrants History.

This item awards points for each warrant (excluding traffic and dependency) during the past 18 months.

Item	B	Sig.	Exp(B)
Warrants History	0.175	0.000	1.191

This variable is significant. We'll come back to it later.

5. Prior Sustained Offense

This item awards points for each prior sustained offense. More points awarded for felony than misdemeanor.

Item	B	Sig.	Exp(B)
Prior Sustained Offense	0.233	0.000	1.263

This variable is significant. We'll come back to it later.

6. Mitigating Factors

This is a composite item, meaning it has multiple variables that combine to form the Mitigating Factors score.

Item	B	Sig.	Exp(B)
Mitigating Factors—Original ▪ School/Employed ▪ Responsible Adult ▪ No Referrals past year ▪ First Referral Age 16+ ▪ Instant Offense is First Referral ▪ Not on Probation ▪ No FTA Warrant History	0.267	0.000	1.306

All of the variables were significant, EXCEPT for Not on Probation and No FTA Warrant History. These two variables scored in the wrong direction as well, which is dragging down the usefulness of the Mitigating Factors item, and so we strongly recommended that they be dropped from the RAI. Using the shorthand version of the Exp(B), we can see that for every 1-point increase in score, youth are 31% more likely to FTA/commit new offense.

We constructed several variations to this item to see if we could find better results using fewer variables. Essentially, we successively dropped the weakest items from the constellation of variables. The best combination appears below:

Item	B	Sig.	Exp(B)
Mitigating Factors—Option 4 ▪ School/Employed ▪ First Referral Age 16+ ▪ Instant Offense is First Referral	0.368	0.000	1.445

7. Aggravating Factors

This is a composite item, meaning it has multiple variables that combine to form the Aggravating Factors score.

Item	B	Sig.	Exp(B)
Aggravating Factors—Original ▪ No Community Ties ▪ Possession of Firearm ▪ Runaway—Home and Placement ▪ Runaway—Placement Only ▪ Multiple Victims ▪ Threats to Victim/Witnesses	0.082	0.050	1.086

The score for the composite item, Aggravating Factors, was not significant at the .01 level. Two of the sub-variables, No Community Ties and Possession of Firearm operate in the wrong direction, and so we strongly recommended that these two be dropped from the RAI. Of the remaining 4 variables, only the Runaway variables were significant.

We constructed several variations to this item to see if we could find better results using fewer variables. Essentially, we successively dropped the weakest items from the constellation of variables. The best constellation appears below:

Item	B	Sig.	Exp(B)
Aggravating Factors—Option 6 ▪ Runaway—Home and Placement	0.165	0.000	1.179

Overall Score

The overall score is derived by adding the points awarded/subtracted on the 7 RAI items. It is comprised of the following items and sub-variables:

Item	B	Sig.	Exp(B)
Overall Score—Original	0.271	0.000	1.311
Most Serious Instant Offense			
Additional Current Offense			
Legal Status—Original			
▪ Currently Under Supervision			
▪ Felony Violence/Asslt/DV/Firearm			
▪ Most Serious Pending Offense			
▪ On Conditional Release			
Warrants History			
Prior Sustained Offense			
Mitigating Factors—Original			
▪ School/Employed			
▪ Responsible Adult			
▪ No Referrals past year			
▪ First Referral Age 16+			
▪ Instant Offense is First Referral			
▪ Not on Probation			
▪ No FTA Warrant History			
Aggravating Factors—Original			
▪ No Community Ties			
▪ Possession of Firearm			
▪ Runaway—Home and Placement			
▪ Runaway—Placement Only			
▪ Multiple Victims			
▪ Threats to Victim/Witnesses			

Given the poor results for the Most Serious Instant Offense item and the lack of utility of the Additional Current Offenses item, we used the remaining 5 RAI items in multiple constellations to identify that with the strongest relationship to the risk of FTA/new offense. The best combination is presented below:

Item	Group	B	Sig.	Exp(B)
Overall Score—Option 6	Total	0.398	0.000	1.488
Legal Status—Option 3				
▪ Currently Under Supervision	Male	0.406	0.000	1.501
▪ Most Serious Pending Offense	Female	0.344	0.000	1.410
Mitigating Factors—Option 4				
▪ School/Employed	White	0.405	0.000	1.500
▪ First Referral Age 16+	Black	0.347	0.000	1.415
▪ Instant Offense is First Referral	Hispanic	0.364	0.020	1.439
Aggravating Factors—Option 6				
▪ Runaway—Home and Placement				

Scoring: Item Weights and Scale Cut-Points

Once the items with the strongest relationship to the risk of recidivism/FTA were identified, we needed to develop a scoring convention that assigned weights to each item and that identified the cut-points for the scale used to identify those who should be detained, released with conditions of supervision, and released unconditionally.

The item weights needed to be based in some sort of logic—mathematical or otherwise. In some cases, it made sense to keep the scoring convention that existed on the original RAI, providing it was in keeping with the relative strength of the item's relationship to recidivism. *Currently Under Supervision* and *Most Serious Pending Offense* fell into this category (there were also logistical reasons for trying to keep the scoring rubric for MSPO the same). Given that so many points could potentially be allocated for MSPO, we didn't want that item to overwhelm the others, so we increased the number of points for the mitigating and aggravating factors accordingly. In addition, the *Mitigating Factors* items were among those with the most powerful relationship to recidivism in Phase I, so giving them more points than *Currently Under Supervision* was logical.

Table 1. Scoring Convention for New RAI

Item	Proposed Weight
Currently Under Supervision (score most serious)	
Parole/Committed to YCF/Probation	2
Def Dispo/Acctab Agrmt/Sole Sanction	1
No Formal Supervision	0
Most Serious Pending Offense (score most serious)	
Intentional homicide	17
Att Murder/ A Felony with violence or weapon	12
B Felony with violence or weapon	8
Rape I/Sod I/Sex Pen I w/out forcible compulsion	7
C Felony with violence or weapon	6
All other A and B felonies	5
All other C felonies/ Misdemeanor with viol/weapon	3
All other misdemeanors/PV	1
No pending offense, or status offense only	0
Mitigating Factors (score all that apply)	
School/Employed	-3
First offense at age 16+	-3
Instant offense is 1st offense	-3
Aggravating Factor	
Runaway from home or placement	3

Determining the cut-points for the various decision categories required searching for the point in the distribution of scores at which the time to recidivism changed markedly. The table below shows the cut points that resulted in the most homogeneous groups with the greatest difference from each other. Placing the cut points at less than zero, zero to 5, and 6 or more points produced groups with significantly different times to recidivism. Note that the Original RAI produced time-to-recidivism averages that are not linear and that do not have good separation.

Table 2. Days to Recidivism, by Detention Decision, Old and New

Detention Decision	**Original RAI** Range -9 to 74 points	**New RAI** Range -9 to 22 points
Unconditional Release	142 days (6 points or less)	171 days (Less than 0 points)
Conditional Release	75 days (7 to 11 points)	92 days (0 to 5 points)
Detain	97 days* (12 points or more)	55 days (6 points or more)
these youth scored in the detain category, but were overridden to the release category, thus their time at risk could be calculated		

Setting the cut point for Detain at 6 points had another effect that we didn't plan initially, but believe to be a good thing: all felony offenses with violence or weapon score at least 6 points, meaning that there will be a presumption of detention for offenders with these types of pending offenses.

When applied to the sample of records that we used for the study, the new instrument and scoring convention created the following populations:

Table 3. Scored Decision Category, Original RAI versus New RAI

Decision Category	**Original RAI (scored)**		**New RAI (scored)**	
	N=3,945	%	N=3,945	%
Unconditional Release	1,868	47	1,052	27
Conditional Release	1,081	27	2,296	58
Detain	996	25	597	15

In general, the new RAI creates significant increases in the number of situations that would result in conditional release, while reducing the number of situations that would result in detention and that would result in unconditional release.

Table 4. Original RAI versus New RAI, Scored Decision Category					
SCORED Category	Original RAI				Total
		Unconditional	Conditional	Detain	
New RAI	Unconditional	924 23%	104 3%	24 1%	1052 27%
	Conditional	927 23%	779 20%	590 15%	2296 58%
	Detain	17 <1%	198 5%	382 10%	597 15%
Total		1868 47%	1081 27%	996 25%	3,945 100%

The shaded cells along the diagonal represent those episodes in which the detention decision would not change between the original RAI and new RAI. These include approximately 53% of all episodes in the study population. The unshaded cells represent those episodes that do change:

- [under the diagonal] For about 29% of the episodes (n=1,142), the new RAI scores them into a more restrictive category than the original RAI. About 80% of these are from unconditional to conditional release. Only about 2% go from unconditional to detain, and about 17% go from conditional to detain.
- [above the diagonal] For about 19% of the episodes (n=718), the new RAI scores them into a less restrictive category than the original RAI. About 80% of these are from detain to conditional release. Only about 3% go from detain to unconditional release, and about 14% go from conditional to unconditional release.