Final Report
Validation of the Risk/Needs Assessment for use in New Mexico

Prepared by:
The Center for Applied Research and Analysis,
The Institute for Social Research,
The University of New Mexico

Paul Guerin, Ph.D.
Ray Liedka, Ph.D.
Kristine Denman, M.A.

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Section One - Introduction

Introduction

The Institute for Social Research (ISR) has completed several reports during its contracts with the New Mexico Corrections Department (NMCD), Probation and Parole Division (PPD) to validate the Risk/Needs Assessment (RNA) currently used by the NMCD PPD. Several analyses and reports (*Status Report: Validating the New Mexico Risk/Needs Assessment Instrument June 1998* and *Validation of the Risk/Needs Assessment for use in New Mexico: Preliminary Findings March 1999*) have been completed as part of the process of validating the RNA and have focused on two different measures of risk: technical violations and termination status. The current report completes this series of analyses and focuses on measures of subsequent arrests (recidivism). This is the only report which focuses on subsequent criminality rather than how the person performs while on probation or parole. Also, unlike previous reports, this analysis includes a check of both the initial assessment and final reassessment.

This report is divided into six sections. First, is this brief introduction section. Second, we discuss the methods used to complete the current analysis. Third, we present the results of the set of analyses which examine how well the initial assessment predicts risk. Fourth, we compare the results of all of the analyses completed from both the current report and prior reports. Included in this section are our recommendations for improving the initial assessment of the current RNA. Fifth, we present the results of the set of analyses which examine how well the final reassessment predicts subsequent arrests. Sixth, recommendations for improving the final reassessment of the RNA are discussed.

Sections two and three deal with the validations of the initial Risk/Needs Assessment while sections four and five are concerned with the validation of the final Risk/Needs Reassessment.

Section Two - Methods

This section describes the methods used to complete the validation of both the initial RNA and final RNA. The initial assessment is administered soon after the client has been placed into a supervision program. The final reassessment is completed at the time the client ends their probation or parole supervision.

The procedure used here is essentially the same as we have used in previous reports. First, we examine how the instrument predicts overall risk. Second, we examine how each item predicts risk. Third, we conduct a series of multivariate analyses to determine the utility of each portion of the RNA.

Data

The sample used for this analysis includes data provided in automated form by the PPD as well as the hard copy data collected by ISR staff.[1] From the initial 2051 cases, 1068 (52%) cases were selected by the SPSS random sample procedure as a construct sample. The other half of the sample will be used to validate any changes made to the RNA. If changes are made to the RNA, before those changes are implemented, they will need to go through the same procedure that was used to assess the validity of the current instrument using the validation sample. Note that this random sample is not the same as the ones used in prior analyses, although certainly some of the clients are in more than one sample. The purpose for generating a new random sample for each analysis is to reduce the likelihood that the results obtained are sample specific. We want to be sure that we are not basing all of our results on some possible peculiarity of a specific sample.

Dependent variables

This analysis includes four measures of recidivism. The first two are used as dependent variables for testing the initial RNA. They are whether there are any subsequent arrests after supervision began and the number of subsequent arrests. The second two are used as dependent variables for testing the predictive efficacy of the final RNA. These variables are whether there were any arrests after supervision ended and the number of arrests after supervision ended. Note that we distinguished between offenses that occurred after supervision *began* and after supervision *ended.* In order to make inferences about the predictive ability of the reassessment, only offenses that occurred after supervision ended could be included. This is because the reassessment cannot predict what has already happened, only what may happen in the future.

We include both whether someone is subsequently arrested and the number of times they are arrested because there may be a difference between offenders who are arrested once versus offenders who are arrested more than once. Additionally, there are sometimes problems with the accuracy of prediction when the criterion measure is binary (arrested or not) and the base rate

[1]More detailed information regarding the data is presented in prior reports.

gets further from 50% (either a large proportion who re-offend or a large proportion who do not) (Gottfredson, 1987). However, concerns regarding the base rate lessen when the criterion is not binary. Thus, both binary (arrested or not) and count variables (number of times arrested) are examined.

There are some limitations with the use of subsequent arrests as a measure of recidivism. Subsequent arrests reflect whether the individual is charged with any new offenses after supervision began. This does not *necessarily* reflect whether the person subsequently engaged in criminal activity. It may be that someone engaged in criminal activity but was not caught. Alternatively, a person may have been arrested, but not be guilty.

One way to overcome the first problem, not capturing all subsequent offenses, is to gather self reported delinquency. However, this is a very resource intensive method of obtaining criminality. Further, even self reported delinquency may not be accurate as some people will under-report and others will over-report the amount of criminal activity they have engaged in. Thus, we had to include only official reports of criminal activity. This is also the only information available and is the most valid indicator of criminal activity.

An alternative method that can be used to account for guilt is to use subsequent convictions. However, we discovered that the FBI rap sheets are often missing disposition information. Additionally, subsequent arrests are a more valid indicator of criminal activity and recidivism.

All types of arrests are included (violent, drug, property, traffic offenses, etc.). There has been some concern presented in the literature regarding the inclusion of traffic offenses as a measure of recidivism since traffic offenses are so minor. However, very few (less than 10) of the clients in the construct sample were re-arrested for traffic offenses.

Independent variables

The twenty-three items that are currently used on the initial RNA as well as several other independent and control variables were included as independent variables for assessing the ability of the initial RNA to predict recidivism. These variables are listed below.

- Number of address changes in the last twelve months
- Percentage of time employed in the last twelve months
- Alcohol usage problems
- Other drug usage problems
- Attitude
- Age at first adjudication
- Number of prior periods of probation/parole
- Number of prior felony convictions
- Convictions for property offenses, and
- Convictions for assaultive offense in the last five years.
- Academic/vocational skills,
- Employment,

- Financial management,
- Marital/family relationships,
- Companions,
- Emotional stability,
- Alcohol usage,
- Other drug usage,
- Mental ability,
- Health
- Sexual behavior
- The PPO's impression of the level of the client's needs
- Prior convictions for a violent offense
- Prior convictions for a drug offense
- Whether a weapon was used during the commission of the current offense
- Age at intake
- Whether the offender is living with friends
- Whether the offender is a probationer (versus parolee)
- Gender of offender
- Race of offender
- Length of the follow up period (from beginning date of supervision)

The twenty-four independent variables used for testing the final RNA are the items currently used on the reassessments. Additionally, the other independent and control variables used for testing the initial RNA were also included. Below is a list of the items currently on the reassessment.

- Address changes
- Age at first conviction
- Number of prior probation/parole revocations
- Number of prior felony convictions
- Prior convictions for property offenses
- Percentage of time employed
- Alcohol usage problems
- Other drug usage problems
- Problems with current living situation
- Social identification
- Response to court imposed conditions
- Use of community resources
- Academic/vocational skills
- Employment
- Financial Management
- Marital/family relationships
- Companions
- Emotional stability
- Alcohol usage

- Other drug usage
- Mental health
- Physical Health
- Sexual behavior
- PPOs impression of needs

Data analysis

Several statistical techniques are used to analyze the data to determine whether the instrument performs as expected. The same techniques are used to evaluate both the initial assessment and final reassessment. First, using contingency tables, we examine the outcomes associated with each level of supervision. Outcomes should be worse (a higher proportion of subsequent arrests or mean number of arrests) for clients classified into more intense levels of supervision and better outcomes for clients in lower levels of supervision.

Second, Logistic regression is used to determine whether the instrument predicts whether there are any subsequent arrests. The effectiveness of the risk portion of the instrument, the needs portion of the instrument and other items not currently on the instrument are examined separately.

Third, Poisson regression is used when the dependent variable is a "count" variable, or a measure of the number of times an event occurs. Therefore, this technique is used to assess the effectiveness of each part of the instrument in predicting the number of subsequent arrests.

Finally, a negative binomial regression is used to compare against the results of the Poisson regression. The legitimacy of the Poisson regression model relies on the mean and variance of the conditional dependent variable being the same. **Typically, when there are many zeros-in the current case this means no re-arrest-this property often does not hold.** Thus, we estimate the negative binomial as a check on the poisson analysis.[2]

[2]See "Validation of the Risk/Needs Assessment for use in New Mexico: Preliminary Findings," March 1999, for more information regarding the differences between Poisson regression and negative binomial regression.

Section Three - Initial Assessment Results

Proportion of clients in sample who are re-arrested
Table 3.1 illustrates the percentage of the clients who are arrested after supervision began. Approximately 59% of the clients were arrested after supervision began and 46% were arrested after supervision ended. These numbers indicate that the base rate of recidivism for this sample is close to 50-50 for those arrested after supervision ended and is a little further apart for those arrested after supervision began. Most probably it is not far enough to cause substantial problems for accurate prediction.

Table 3.1 - Percent of Offenders Arrested After Supervision Began

	No	Yes
Arrested after supervision began?	41.2%	58.8%

Next, we look at how well the RNA predicts subsequent arrests by the initial supervision status. We examine both the computed and assigned levels of supervision because the classification based on the RNA score can be overridden.

Subsequent arrests by level of supervision
Table 3.2 illustrates the percentage of cases which have subsequent arrests after supervision began by the initial computed supervision status. As expected, the proportion of clients who have at least one subsequent arrest increased as supervision status increased. In other words, clients in higher supervision levels are more likely to be arrested after supervision begins. We also examine the average number of arrests and found the mean number of arrests increases with increasing levels of supervision.

Table 3.2 - Subsequent Arrests by Initial Computed Supervision Status

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	64.6%	51.3%	32.8%	379
Subsequent arrests	35.4%	48.7%	67.2%	541
Total N	65	304	551	920
Mean number of subsequent arrests***	.68 (1.31)	1.18 (2.04)	2.01 (2.54)	1.64 (2.36)

p<.001

We then examine the risk and needs sections separately to determine whether one predicts risk better overall than the other. Tables 3.3 and 3.4 provide the results. While both predict recidivism, there are some differences. The needs section appears to more sharply discriminate between those subsequently arrested and those not subsequently arrested than does the risk portion. This is readily seen by comparing the extreme levels of supervision, those assigned to minimum supervision and those assigned to maximum supervision. For the risk portion of the RNA, 68% and 43% of those assigned to maximum and minimum supervision, respectively, were subsequently arrested. But for the needs portion, the figures are 72% and 38% subsequently re-arrested. When the mean number of arrests are compared, a slightly higher average number of re-arrests is indicated for those computed to minimum supervision by the needs portion as compared to the risk portion. However, there is a higher average number of reoffenses for those computed to maximum supervision by the needs portion compared to the risk portion.

Table 3.3 - Subsequent Arrests by the Computed Risk Portion of the RNA

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	57.1%	44.0%	32.1%	379
Subsequent arrests	42.9%	56.0%	67.9%	541
Total N	219	243	458	920
Mean number of subsequent arrests***	.88 (1.40)	1.44 (2.26)	2.11 (2.65)	1.64 (2.36)

Table 3.4 - Subsequent Arrests by the Computed Needs Portion of the RNA

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	61.7%	45.1%	28.4%	379
Subsequent arrests	38.3%	54.9%	71.6%	541
Total N	115	477	328	920
Mean number of subsequent arrests***	.94 (1.77)	1.38 (2.19)	2.25 (2.63)	1.64 (2.34)

Finally, whether there are subsequent arrests and the average number of arrests by the assigned

level of supervision is shown in Table 3.5. Note this is slightly less accurate for clients assigned to minimum supervision as approximately half have at least one subsequent arrest (35% of clients computed as minimum supervision have one or more arrest). A smaller percentage of medium supervision clients have one or more arrest and nearly the same proportion of maximum supervision clients are recidivists.

Table 3.5 - Subsequent Arrests by Initial Assigned Supervision Status

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	50.8%	53.7%	31.4%	379
Subsequent arrests	49.2%	46.3%	68.6%	541
Total N	59	352	509	920
Mean number of subsequent arrests***	1.64 (3.56)	1.06 (1.67)	2.04 (2.51)	1.64 (2.36)

p<.001

Re-arrests by each RNA item

Next, we examined the outcomes by each of the RNA items. Recall that there are two outcomes: (1) the proportion of clients with a subsequent arrest or not, and (2) the average number of subsequent arrests. The first two columns in Table 3.6 compare the proportion of clients who have not been re-arrested since their supervision began to those who have been re-arrested. We would expect that as the risk scores within each item increase, the proportion of clients who recidivate would increase relative to those who do not. The statistical significance of each item is indicated next to the first number in each cell. The third column indicates the average number of subsequent arrests by each category within each RNA item. We expect that as the scores within each RNA item increase, the mean number of arrests will increase. The standard deviation of each mean is included in parentheses. The degree of statistical significance within each set of means is indicated next to the first mean. Note that this is the overall statistical significance and indicates that at least one of the pairs of means is statistically significant, but not necessarily all of them. Thus, the final column indicates which pair of means is significantly different from one another. This is important to help determine whether categories need to be combined or altered in some other way.

Risk items

We begin by describing the risk items which do not have conflicting results and which appear to be able to differentiate between recidivists and non-recidivists. First, we found that the *percentage of time employed* does appear to differentiate between those who recidivate and those who do not. Clients employed more than 60% of the time had a slightly more than 50-50

likelihood of a subsequent arrest (51.4% had re-arrests). This proportion rises to 63% and 67% for clients working between 40% to 59% of the time and less than 40% of the time, respectively. Clearly, the major demarcation point for predicting subsequent arrests is whether a client worked more or less than 60% of the time. This pattern, and the demarcation point of 60% is seen also in the mean number of arrests. The post hoc t-tests performed indicate that only two pairs are significantly different from each other: 0, 1 and 0, 2. This indicates there is a difference between those employed 60% of the time or more and those who are employed less than that.

Alcohol usage problems also differentiated clients according to re-arrest rates. About half (49.8%) of clients with no problems were re-arrested, while over 60% of clients with occasional abuse problems (64.1%) or frequent abuse problems (61.8%) were re-arrested. Akin to the situation with employment, the key demarcation for this RNA item is no problem with alcohol vs. any problem. *Drug abuse problems* was even more strikingly effective in discriminating amongst client re-arrest probabilities. Of clients with no drug abuse problems, 46% were re-arrested, while 66% of those with occasional abuse problems and 75% of those with frequent abuse problems were subsequently arrested. However, it should be noted that there were no differences in mean number of re-arrests for the categories of this item.

Age at first adjudication is similar to the RNA items already discussed. Of those clients whose first adjudication was at age 24 or older, 43.2% were re-arrested, while 65% and 70% of clients were re-arrested when their first adjudication occured between the ages of 20 to 23, or 19 or younger, respectively. Having three age categories seems somewhat redundant, since the difference in re-arrest rates between clients in the two younger age groups is minimal. While all three categories had significantly different mean number of re-arrests, there is a rather large observable gap between the 24 or older category and the other two, analogous to the separation seen in proportion of clients with re-arrests.

Three additional RNA items work just as expected in predicting the likelihood of re-arrest. These items are: the *number of prior periods under probation/parole supervision*, the *number of prior probation/parole revocations*, and the *number of prior felony convictions*. In all cases, the average number of re-arrests paralleled the recidivism patterns.

Two RNA items had odd, but statistically significantly results. *Client attitude* did differentiate between client re-arrest likelihood, but not in the manner one would expect. The middle category–clients judged too "dependent or unwilling to accept responsibility" by their PPO– resulted in a 72% re-arrest rate. But the proportion of re-arrested clients was quite similar for the category "motivated to change" and "rationalizing behavior." This is quite unexpected, and might indicate either that the subjective judgement of PPOs is not as good as hoped, or simply that verbal indications of a client's desire to reform cannot be used to assess likelihood of subsequent criminal behavior and arrest. However, contrary to the re-arrest data, the mean number of re-arrests followed the RNA scoring for this item.

The second item with results contrary to expectations embedded in the RNA scoring system is the *type of conviction or juvenile adjudication*. The middle two categories of this item are

scored in such a manor as to suggest that convictions or adjudications for burglary, theft, motor theft or robbery (scored a 2) are less indicative of risk than are convictions or adjudications for forgery or passing worthless checks (scored a 3). The proportion of clients re-arrested in these two categories is 73.7% and 54.0%, respectively. Indeed, in terms of predicting re-arrest, this entire item seems to break between those with a burglary, theft, or robbery conviction and those without such a conviction or juvenile adjudication. Note that this odd pattern is also followed by the mean number of re-arrests.

Two items had no statistically significant predictive ability to tell recidivists apart from non-recidivists. These two items are the *number of address changes*, and whether the client had a *conviction or juvenile adjudication for assault during the prior 5 years*. For both these items, the rate of recidivism followed the expected direction for both, but the differences were too small to allow statistically based conclusions of true underlying differences. For example, the final risk item, *conviction or juvenile adjudication for assault in last 5 years*, has recidivism rates of 58.4% for those without a conviction, and the similar level of 60.0% recidivism for those with a conviction. The difference is small and suggests the possibility that this item does not help to identify risky clients. This is not true, however, for the mean number of re-arrests for the number of address changes. The multivariate analysis to follow, will prove a more useful analytic setting to make this determination.

Table 3.6 - Subsequent Arrests by Each Risk Item from the Initial Assessment

Risk items	**No Subsequent arrests**	**Subsequent arrests**	**Mean number of arrests (std. Deviation)**	**Significant pairs**
Address changes				
0 None	43.4%	56.6% N/S	1.37 (1.92)***	0, 2
2 One	41.2%	58.8%	1.83 (2.65)	0, 3
3 Two or more	34.7%	65.3%	2.11 (2.89)	
Percentage of time employed				
0 60% or more	48.6%	51.4%***	1.35 (2.13)**	0, 1
1 40%-59%	37.1%	62.9%	1.87 (2.64)	0, 2
2 Under 40%	33.1%	66.9%	1.91 (2.45)	
Alcohol usage problems				
0 No interference with functioning	50.2%	49.8%***	1.44 (2.49) N/S	none
2 Occasional abuse: some disruption of functioning	35.8%	64.2%	1.69 (2.23)	
4 Frequent abuse: serious disruption, needs treatment	38.2%	61.8%	1.77 (2.34)	
Other drug usage problem				
0 No interference with functioning	54.2%	45.8%***	1.06 (1.89)***	all pairs
1 Occasional abuse: some disruption of functioning	33.6%	66.4%	1.80 (2.36)	
2 Frequent abuse: serious disruption: needs treatment	24.6%	75.4%	2.60 (2.82)	
Attitude				
0 Motivated to change, receptive to assistance	45.3%	54.7%***	1.51 (2.25)*	none
3 Dependent or unwilling to accept responsibility	28.0%	72.0%	1.89 (2.08)	
5 Rationalizing behavior, negative, not motivated	40.6%	59.4%	2.20 (3.76)	
Age at first adjudication				
0 24 or older	56.8%	43.2%***	1.05 (2.07)***	all pairs
2 20 to 23	35.0%	65.0%	1.65 (2.04)	
4 19 or younger	30.4%	69.6%	2.14 (2.60)	
Number of prior periods of probation/parole				
0 None	49.5%	50.5%***	1.11 (1.78)***	all pairs
4 One or more	31.4%	68.6%	2.27 (2.77)	
Number of prior probation/parole revocations				
0 None	47.6%	52.4%***	1.32 (2.05)***	all pairs
4 One or more	16.4%	83.6%	2.88 (2.97)	
Number of prior felony convictions				
0 None	47.8%	52.2%***	1.27 (2.00)***	all pairs
2 One	32.2%	67.8%	1.95 (2.40)	
4 Two or more	21.1%	78.9%	2.97 (3.16)	
Conviction or juvenile adjudications for				
0 None	49.4%	50.6%***	1.24 (2.03)***	0, 2
2 Burglary, theft, auto theft or robbery	26.3%	73.7%	2.30 (2.66)	0, 5
3 Worthless checks or forgery	46.0%	54.0%	1.43 (2.14)	2, 3
4 Both categories	23.5%	76.5%	2.97 (3.20)	3, 5
Conviction or juvenile adjudication for assault in last 5 years				
0 No	41.6%	58.4% N/S	1.60 (2.35) N/S	none
15 Yes	40.0%	60.0%	1.76 (2.39)	

*** p<.001 ** p<.01 * p<.05

Needs items

There are seven (7) statistically significant items on the needs portion of the RNA instrument. However, not all seven of these perform as expected for predicting recidivism. Of the seven, there are four that follow a pattern of increasing recidivism that parallels the item scoring. Two of the items come close to this ideal matching of scoring with recidivism, and one has a pattern of re-arrest completely opposite its scoring.

Four items are not statisticallly significant. These items are *marital/family relationships*, *emotional stability*, *mental ability*, and *sexual behavior*. When considering the average number of re-arrests, rather than the prevalence of recidivism, two additional items are not significant, *financial management* and *alcohol usage*. These are possible candidates for exclusion from any revised version of the RNA instrument.

The *employment* item is statistically significant and in the expected direction in terms of both recidivism and the average number of re-arrests. The worse the employment situation of a client, the higher the recidivism rate and the mean number of re-arrests. This pattern is statistically significant. The result is also seen for the item pertaining to the client's *companions*. The more positive the support and influence of a client's companions, the lower the recidivism rate and the lower the average number of re-arrests. This effect is most pronounced for the category of "good support and influence" where the rate of recidivism is a meager 20% and the average number of re-arrests is only 0.20.

Both the substance abuse items, *alcohol usage* and *other drug usage*, discriminate rather well between recidivists and non-recidivists. The more frequent, or serious, the alcohol or drug usage, the higher the rate of recidivism and the greater the average number of arrests. However, for alcohol usage, the prevalence of re-arrest is reversed for the two more serious categories (64.6% recidivism *for occasional abuse, some disruption of functioning* vs. 61.8% *for frequent abuse, serious disruption, needs treatment*). The greatest demarcation amongst the categories for these two items, both in terms of likelihood of being re-arrested and in the average number of re-arrests, is between *no interference with functioning* and some kind of abuse, whether it be occasional or frequent.

The item on *academic/vocational skills* is statistically significant, and generally follows the expected pattern for both outcome measures. However, the separation in outcome measure for the two categories (*low skill level* and *minimal skill level*) is very slight. For recidivism, the rates are 71.9% and 68.4% respectively, while the mean number of re-arrests are 2.29 and 2.31 respectively. Perhaps these two categories ought to be combined.

Finally, one item–Client *health*–illustrates one potential problem with the entire needs portion of the RNA. For this item, the more serious the health problem, the higher the scoring of the item. However, in terms of the proportion of clients that recidivate and the mean number of re-arrests of clients, the lower the scoring the worse the outcome – more recidivism. This is actually a sensible result, as the more sound is a client's health, the better able they are to pursue criminal

activity which frequently requires the ability to move quickly or to climb or lift, or, at the least, to run if discovery is imminent. This item is scored in a manner to truly identify needs of the client, yet by totalling a score for this portion (alone or in combination with the risk component) the RNA instrument overall is geared more towards identification of risk. Quite likely completely separate risk and need instruments would need to be clearly separated by task and usage.

Table 3.7 - Subsequent Arrests by Each Needs Item from the Initial Assessment

Needs items	**No Subsequent arrests**	**Subsequent arrests**	**Mean number of arrests (std. Deviation)**	**Significant pairs**
Academic/vocational skills				
-1 High school or above	51.0%	49.0%***	1.17 (1.93)***	-1, 2
0 Adequate skills: able to handle everyday requirements	43.6%	56.4%	1.50 (2.22)	-1, 4
2 Low skill level causing minor adjustment problems	28.1%	71.9%	2.29 (2.66)	0, 2
4 Minimal skill level causing serious adjustment problems	31.6%	68.4%	2.31 (3.30)	
Employment				
-1 Satisfactory employment for one year or more	63.3%	36.7%***	.74 (1.19)***	-1, 3
0 Secure employment: no difficulties reported	49.0%	51.0%	1.28 (2.14)	-1, 6
3 Unsatisfactory employment/unemployed but has adequate job skills	34.5%	65.5%	1.93 (2.42)	0, 3
6 Unemployed and virtually unemployable	30.0%	70.0%	2.18 (3.15)	0, 6
Financial Management				
-1 Long standing pattern of self-sufficiency	88.9%	11.1%**	.11 (.33) N/S	none
0 No current difficulties	46.0%	54.0%	1.50 (2.46)	
3 Situational or minor difficulties	39.3%	60.7%	1.67 (2.27)	
5 Severe difficulties	34.4%	65.6%	2.06 (2.90)	
Marital/family relationships				
-1 Relationships and support exceptionally strong	62.5%	37.5% N/S	.88 (1.46) N/S	none
0 Relatively stable relationships	43.6%	56.4%	1.50 (2.21)	
3 Some disorganization or stress but potential for improvement	37.7%	62.3%	1.80 (2.46)	
5 Major disorganization or stress	39.7%	60.3%	1.87 (2.86)	
Companions				
-1 Good support and influence	80.0%	20.0% ***	.20 (.48)***	0, 2
0 No adverse relationships	48.6%	51.4%	1.20 (1.84)	0, 4
2 Associations with occasional negative results	38.8%	61.2%	1.85 (2.59)	2, 4
4 Associations almost completely negative	20.0%	80.0%	2.63 (2.85)	
Emotional stability				
-2 Exceptionally well adjusted; accepts responsibility for actions	40.0%	60.0% N/S	1.40 (1.67) N/S	none
0 No symptoms of emotional instability	42.5%	57.5%	1.57 (2.27)	
4 Symptoms limit but do not prohibit adequate functioning	35.2%	64.8%	1.99 (2.75)	
7 Symptoms prohibit adequate functioning	41.2%	58.8%	1.53 (2.15)	
Alcohol usage				
0 No interference with functioning	50.3%	49.7%***	1.45 (2.45) N/S	none
3 Occasional abuse; some disruption of functioning	35.4%	64.6%	1.71 (2.30)	
6 Frequent abuse; serious disruption, needs treatment	38.2%	61.8%	1.75 (2.32)	
Other drug usage				
0 No interference with functioning	53.3%	46.7%***	1.05 (1.79)***	0, 3
3 Occasional abuse, some disruption of functioning	32.5%	67.5%	1.96 (2.55)	0, 5
5 Frequent abuse, serious disruption, needs treatment	25.6%	74.4%	2.58 (2.86)	3, 5
Mental ability				
0 Able to function independently	41.9%	58.1% N/S	1.61 (2.36) N/S	none
3 Some need for assistance, potential for adequate adjustment	31.0%	69.0%	1.95 (2.29)	
6 Deficiencies severely limit independent functioning	14.3%	85.7%	2.71 (2.56)	
Health				none
0 Sound physical health, seldom ill	40.1%	59.9%*	1.69 (2.41)*	
1 Handicap or illness interferes with functioning on regular basis	46.8%	53.2%	1.24 (1.73)	
2 Serious handicap or chronic illness	65.2%	34.8%	.65 (1.19)	
Sexual behavior				
0 No apparent dysfunction	41.0%	59.0% N/S	1.64 (2.35) N/S	

Needs items	**No Subsequent arrests**	**Subsequent arrests**	**Mean number of arrests (std. Deviation)**	**Significant pairs**
3 Real or perceived situational or minor problems	36.4%	63.6%	1.59 (1.89)	none
5 Real or perceived chronic or severe problems	56.3%	43.8%	1.56 (3.48)	

*** p<.001
** p<.01
* p<.05

While information regarding bivariate relationships is informative, it is important to also look at how the items work together. The results of the multivariate analyses (Logistic Regression, Poisson and Negative Binomial Regressions) are presented next.

Logistic regression results

Four logistic regression models testing three hypotheses are compared. First, we wanted to determine if the needs portion of the instrument predicts whether a client has at least one subsequent arrest over just the risk portion. By comparing the likelihood ratios of Models 1 and 3, we see that it does **not** (χ^2=35.71, df= 31). Second, we wanted to assess whether the risk portion of the instrument significantly improves the fit of the model over just the needs portion and so the likelihood ratios of Models 2 and 3 are compared. We found that the risk portion of the instrument does predict recidivism (χ^2=66.80, df= 20, p<.001). Since the inclusion of the needs portion of the instrument does not significantly improve the fit of the model, the results in Model 1 are preferred. A fourth model including items not currently included on the RNA as well as all of the risk items is also computed. A comparison of the likelihood ratios in Models 1 and 4 (χ^2=37.08, df= 12, p<.001) indicates that there are other items included in this model which predict risk. The results from Model 4 are discussed next.

Five of the risk items in Model 4 are statistically significant. These include *alcohol usage problems, drug usage problems*, *attitude*, *number of prior probation/parole revocations* and *prior property offenses*. All of these items are statistically significant in Model 1 as well. The only risk item in Model 1 which is not significant in Model 4 is *age at first adjudication*. It is likely that because age at intake is included in Model 4 and is statistically significant, the high correlation between the two items causes the former to be statistically insignificant. One other variable, *length of follow up period* (which is a control variable) is statistically significant indicating that it is more likely that someone will be arrested over time.

Several of the risk items contained only one category which is significant. *Occasional alcohol abuse* is statistically significant, however, *frequent abuse* is not. This corresponds with the results found in the bivariate. Only the category dependent or unwilling to accept responsibility of the *attitude* item is statistically significant. Finally, only the category measuring burglary, theft, auto theft or robbery of the *prior property offenses* item is statistically significant. The other two categories are not.

Table 3.8 - Logistic Regression Results for Any Re-Arrest

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (Risk scores + other items)
Constant	-.9700	-2.9684	-3.5275	-.0862
Address changes				
One	-.1020		-.0673	-.0872
Two or more	.0971		.1204	.1539
Time employed				
40-59%	.2246		.1773	.1361
Less than 40%	.1502		-.0545	.0126
Alcohol usage problems				
Occasional abuse	.4254*		.2403	.5020**
Frequent abuse	.2643		.0306	.3932
Other drug usage problems				
Occasional abuse	.6128***		.7917	.4747**
Frequent abuse	.7814***		1.1324*	.6479**
Attitude				
Dependent or unwilling to accept responsibility	.4469*		.4162*	.4856*
Rationalizes behavior, negative, not motivated to change	-.1479		-.2272	.0806
Age at first adjudication				
20-23 years old	.5922**		.5215 *	.2132
19 or younger	.5174**		.4472*	.0749
Number of prior periods of probation/parole				
One or more	-.2417		-.2732	-.1867
Number of prior probation/parole revocations				
One or more	1.1368***		1.0952***	1.0385***
Number of prior felony convictions				
One	.1218		.1523	.1503
Two or more	.1366		.1821	.2672
Prior convictions for property offenses				
Burglary, theft, auto theft, robbery	.5215**		.4848*	.4537*
Worthless checks, forgery	.0661		.0830	.2410
Both categories	.5718		.6199	.5675
Conviction for assault in last 5 years				
Yes	-.0700		-.0409	-.3488
Academic/vocational skills				
Adequate skills		.2310	.3072	
Low skill level		.4623*	.4526	
Minimal skill level		-.1146	-.1131	
Employment				
Secure employment		.2618	.1131	
Unsatisfactory employment		.4872	.2167	
Unemployed and unemployable		.7023	.6397	
Financial Management				
No current difficulties		1.5856	1.7754	
Situational or minor difficulties		1.5798	1.8010	
Severe difficulties		1.7230	1.9239	
Marital/family relationships				
Relatively stable relationships		.4406	.4045	
Some disorganization or stress		.2625	.2335	
Major disorganization or stress		-.0426	-.1234	
Companions				
No adverse relationships		1.3424	1.0907	
Associations with occasional negative results		1.3797	.9210	
Associations almost completely negative		2.1579	1.5924	
Emotional stability				
No symptoms of emotional instability		-.2440	.2400	
Symptoms limit but do not prohibit functioning		-.1905	.3189	
Symptoms prohibit adequate functioning		-.7323	-.4030	
Alcohol usage				
Occasional abuse		.3837*	.2455	
Frequent abuse		.2066	.2822	

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (Risk scores + other items)
Other drug usage				
Occasional abuse		.6669***	-.1540	
Frequent abuse		.5488*	-.6354	
Mental health				
Some need for assistance		.6668	.7052	
Deficiencies severely limit functioning		1.1106	1.2309	
Physical Health				
Handicap or illness interferes with functioning		-.3014	-.0924	
Serious handicap or chronic illness		-1.2018*	-1.1865*	
Sexual behavior				
Situational or minor problems		.0067	.2015	
Chronic or severe problems		-.9466	-.5562	
PPOs impression of needs				
Low		-.7918	-.9644	
Medium		-1.1502	-1.3216	
Maximum		-.5754	-1.0085	
Prior offenses				
Prior convictions for a violent offense				.2863
Prior convictions for a drug offense				.2149
Weapon used during commission of current offense				.4220
Age at intake				-.0372***
Married				-.2258
Living with friends				-.6269
Probationer not parolee				-.1471
Male client				-.1554
Ethnicity				
White client				-.3375
Hispanic client				-.1410
African American client				.2599
Length of follow up period				.0112**
Number of observations	886	886	886	886
Likelihood ratio	1053.913	1085.005	1018.207	1016.838

*p<.05

Poisson regression results

A Poisson regression is used to model the number of subsequent arrests, using the RNA items as predictors. The results are presented in Table 3.9. We tested three hypotheses: (1) whether the needs portion improves the predictive fit of the model over just the risk portion, (2) whether the risk portion improves the predictive fit of the model over just the needs portion, and (3) whether the inclusion of additional, non-RNA items improves the fit of the model. By comparing the deviances of Model 1 and Model 3 ($\chi^2 = 103.765$, df =31, $p<0.001$), we found that the needs portion does improve the ability of the model to predict the number of arrests beyond the risk portion. The second hypothesis, that the risk portion predicts number of arrests beyond the predictive ability of just the needs portion, is also supported ($\chi^2 = 163.695$, df = 20, $p<0.001$). The third hypothesis, that the items not currently included in the RNA improve the predictive fit of the model, is also supported ($\chi^2 = 124.644$, df = 11, $p<0.001$). Because the final model is the best predictive model, only Model 4 will be discussed below.

For interpretation of the results, it is important to recognize that the effects reported in the following analyses (for both the poisson and negative binomial) are relative to a reference category. That is, within each RNA item, there will be a regression effect coefficient for each of the categories of the RNA item. The category that is the reference category will have an effect of 0.0000, and the other effects will be relative to that reference category. A significant effect, means that the effect for that category is significantly different from the reference category. A negative effect indicates a lower average number of re-arrests for clients in that category relative to clients in the reference category, and a positive effect indicates a higher average number of re-arrests for clients in that category relative to clients in the reference category.

The first RNA item, *address changes*, has a significant effect in predicting the number of re-arrests. This finding parallels the simple bivariate analysis on mean differences by category seen in Table 3.6, where there were significant differences between the first category and the second two, but not between those second two categories. A client with no address changes will have only 73% as many re-arrests, on average, as clients with one or two or more address changes. There is no indication of any significant difference between the categories "one" and "two or more." It may be sensible to combine these last two categories to make the item distinguish between clients with any change of address from those with no change of address.

The next RNA item, *percentage of time employed*, has a significant effect for each of the categories-but **not** in the expected direction. A client employed "60% or more" of the time will have about 20% more re-arrests on average than a client employed less than 40% of the time. This is an anomalous result, indeed, and contrary to the bivariate results. It would be pure speculation to proffer an explanation of this result.

The third risk item, *alcohol usage problems*, has effects in the expected direction, but they are not statistically significant. This is not the case for the next item, *other drug usage problems*. Here we see that a client with no drug problem ("No interference with functioning") has on average 58.7% as many re-arrests as a client with "Frequent abuse and serious disruption." Those clients with an "occasional abuse" problem average 78.9% as many re-arrests as clients with the most serious problems.

The risk item, *attitude*, partly follows the pattern indicated by the item scoring. Item scoring would suggest that clients who were motivated to change and receptive to assistance would have the lowest mean number of re-arrests, with clients having the worst attitude, engaging in rationalizing behavior and generally unmotivated would the highest average number of re-arrests. Clients in the middle category, with some dependence or unwillingness to accept responsibility, should have an average number of re-arrests in between the other categories.

Clients who are "dependent or unwilling to accept responsibility" have an average number of re-arrests that is 76% that of clients in the other two categories. The other two categories are indistinguishable in terms of the average number of re-arrests expected. Perhaps, controlling for other RNA items, clients that seem motivated are not being truthful.

Age at first adjudication is an item that works precisely as expected. The younger a client was when first adjudicated, the greater the average number of re-arrests. However, contrary to the bivariate analysis, both the "20 to 23" and "24 or older" client categories have significantly lower average re-arrests than the "under 19" clients.

The two items pertaining to prior probation and parole experience work as expected, and in accord with the bivariate results. Clients having *one or more prior periods of probation/parole* will average 35.2% more re-arrests than clients with no prior period of supervision. Similarly, clients having *one or more prior probation/parole revocations* will average 20.8% more re-arrests than client's with no revocations.

Prior felony convictions operates somewhat as expected. A client having **no** prior felony convictions would have, on average, 79.8% as many re-arrests as clients with "two or more" prior convictions. Similarly, those clients with precisely one prior felony conviction would be expected to have, on average, 76.1% as many re-arrests. The difference in expected number of re-arrests between clients with no prior convictions and clients with one prior conviction is not significant, and could be interpreted to indicate collapsing these categories together would be appropriate.

The item *conviction or juvenile adjudications for* several categories of offenses would seem to be able to be made more simple by collapsing all categories with some kind of offense. The only significant difference is between the category "none" and all the other categories. Clients with no prior convictions as juvenile nor as an adult, on average, have 77% as many re-arrests as clients with burglary, theft, auto theft, robbery, passing checks, or forgery convictions.

The next item, *conviction or juvenile adjudication for assault in last 5 years*, behaves quite strangely. We were a bit surprised when, in the bivariate analysis, this item was not statistically significant in separating recidivists. But in the multivariate analysis, the item is statistically significant, but clients with a conviction or adjudication for assault are predicted to have **fewer** re-arrests. On average, clients with no prior assault conviction will have 19.1% more re-arrests than clients without a prior assault conviction. This is totally anomalous.

Getting to the needs portion of the initial RNA assessment, the first item on *academic/vocational skills* is not surprising. Clients with high school or above have a lower predicted average number of re-arrests. However, the differences between these clients and clients with "adequate skills" or "minimal skills" is not statistically significant. The only significant category is "low skill level." Clients with low skill levels, on average, have 22% more re-arrests than other clients regardless of skill level.

The *employment* item in the needs portion is not statistically significant. The regression coefficients are in the order expected, however. This lack of significance might be due to the inclusion of the risk item on employment, which was statistically significant. Consideration of dropping one of the items, or of combining them in some fashion, should be considered.

Financial management indicates a clear statistically significant difference between clients with a "long standing pattern of self-sufficiency" and all other clients. On average, clients with a long standing pattern of self-sufficiency will have, on average, 11.7% as many re-arrests as clients with "no current difficulties", 12.7% as many re-arrests as clients with "situational or minor difficulties", and 11.7% as many re-arrests as clients with "severe difficulties." There are no statistically significant differences amongst the last three categories, and they might be candidates for collapsing into a single category. This pattern was also seen in the bivariate analysis.

The next six RNA items are not statistically significant: *marital and family relationships*, *companions*, *emotional stability*, *alcohol usage*, *other drug usage*, and *mental ability*. In general, the patterns of the regression coefficients for these items tends to be contrary to expectations.

The *health* item has the same pattern in the multi-variate analysis as it displayed in the bivariate analysis. The healthier the client, the greater the number of re-arrests predicted by the analysis. The *sexual behavior* item was not significant in the bivariate analysis, while here it is statistically significant, but not in the expected direction. Clients with "no apparent dysfunction", on average, have more than twice as many re-arrests as those clients with "real or perceived chronic or severe problems". The same is true for clients with "real or perceived situational or minor problems". These two items are, perhaps, true **need** items that should **not** be expected to predict recidivism.

The final RNA item, *PPO's impression of needs* has no significant predictive effect on number of re-arrests.

Of additional information collected on the initial assessment form, and not used in the actual RNA assessment, there are three that have statistically significant effects. The first, *age at intake*, indicates that the older the client is at intake, the lower the average number of re-arrests. For each additional year older a client is at intake, the average number of re-arrests declines by 2.7%. For the second such item, a married client has 14.2% fewer re-arrests on average than a non-married client. The statistically significant effect of this indicator of marriage might be the reason that the RNA item *marital/family relationships* is not significant.

Finally, an African-American client has 42% more re-arrests on average than non-black clients.

Table 3.9 - Initial Assessment Poisson Regression Results

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
Constant	1.5865***	-5.0130**	-3.3262	-3.5833*
Address changes N/S				

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
0 None	-.2824***		-.2910*	-.3152***
2 One	-.1247		-.1388***	-.1328
3 Two or more	.0000		.0000	.0000
Percentage of time employed				
0 60% or more	-.0078		.1190	.1878**
1 40%-59%	.1028		.1656*	.1800*
2 Under 40%	.0000		.0000	.0000
Alcohol usage problems				
0 No interference with functioning	-.0296		-.1757	-.3081
2 Occasional abuse: some disruption of functioning	.0044		-.1306	-.1834
4 Frequent abuse: serious disruption, needs treatment	.0000		.0000	.0000
Other drug usage problem				
0 No interference with functioning	-.5927***		-.5754***	-.5329***
1 Occasional abuse: some disruption of functioning	-.1841		-.2687**	-.2367*
2 Frequent abuse: serious disruption: needs treatment	.0000		.0000	.0000
Attitude				
0 Motivated to change, receptive to assistance	-.0395		-.0405	-.1706
3 Dependent or unwilling to accept responsibility	-.1057		-.1511	-.2772*
5 Rationalizing behavior, negative, not motivated	.0000		.0000	.0000
Age at first adjudication				
0 24 or older	-.2291**		-.0892	.1974*
2 20 to 23	.0233		.0858	.1589*
4 19 or younger	.0000		.0000	.0000
Number of prior periods of probation/parole				
0 None	-.2258**		-.2663***	-.3013***
4 One or more	.0000		.0000	.0000
Number of prior probation/parole revocations				
0 None	-.2933		-.2310**	-.1886**
4 One or more	.0000		.0000	.0000
Number of prior felony convictions				
0 None	-.1225		-.1278	-.2252*
2 One	-.1919*		-.1983*	-.2735**
4 Two or more	.0000		.0000	.0000
Conviction or juvenile adjudications for				
0 None	-.2327		-.2321	-.2613*
2 Burglary, theft, auto theft or robbery	-.0079		-.0172	-.1033
3 Worthless checks or forgery	-.2610		-.2377	-.1947
4 Both categories	.0000		.0000	.0000
Conviction or juvenile adjudication for assault in last 5 years				
0 No	.0514		.0337	.1751*
15 Yes	.0000		.0000	.0000
Academic/vocational skills				
-1 High school or above		.0000	.0000	.0000
0 Adequate skills: able to handle everyday requirements		.1671*	.2185**	.1179

2 Low skill level causing minor adjustment problems		.3359***	.3728***	.2000*
4 Minimal skill level causing serious adjustment problems		.2203	.2814	.1213
Employment				
-1 Satisfactory employment for one year or more		.0000	.0000	.0000
0 Secure employment: no difficulties reported		.2754	.1463	.0798
3 Unsatisfactory employment/unemployed but has adequate job skills		.4701**	.2821	.2191
6 Unemployed and virtually unemployable		.4855*	.4376*	.3373
Financial Management				
-1 Long standing pattern of self-sufficiency		.0000	.0000	.0000
0 No current difficulties		1.9444	2.0464*	2.1472*
3 Situational or minor difficulties		1.8043	1.9247	2.0604*
5 Severe difficulties		1.8708	1.9879	2.1444*
Marital/family relationships				
-1 Relationships and support exceptionally strong		.0000	.0000	.0000
0 Relatively stable relationships		.0965	-.1740	-.0209
3 Some disorganization or stress but potential for improvement		.0159	-.2678	.0859
5 Major disorganization or stress		-.1558	-.4547	-.1986
Companions				
-1 Good support and influence		.0000	.0000	.0000
0 No adverse relationships		1.4932	1.4566	1.2185
2 Associations with occasional negative results		1.6711	1.5696	1.3184
4 Associations almost completely negative		1.7708	1.5957	1.3169
Emotional stability				
-2 Exceptionally well adjusted; accepts responsibility for actions		.0000	.0000	.0000
0 No symptoms of emotional instability		-.1607	-.0217	.1862
4 Symptoms limit but do not prohibit adequate functioning		-.0114	.1916	.3181
7 Symptoms prohibit adequate functioning		-.4415	-.3866	-.3110
Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
Alcohol Usage				
0 No interference with functioning		.0310	.1862	.2577
3 Occasional abuse; some disruption with functioning		.0493	.1677	.1757
6 Frequent abuse; serious disruption, needs treatment		.0000	.0000	.0000
Other drug usage				
0 No interference with functioning		-.5286***	.1004	.1374
3 Occasional abuse, some disruption of functioning		-.0813	.1609	.1092
5 Frequent abuse, serious disruption, needs treatment		.0000	.0000	.0000
Mental ability				
0 Able to function independently		-.1003	-.1953	-.1942
3 Some need for assistance, potential for adequate adjustment		-.0334	.0089	-.0499
6 Deficiencies severely limit independent functioning		.0000	.0000	.0000
Health				

0 Sound physical health, seldom ill		.9017***	.8714**	.6939**
1 Handicap or illness interferes with functioning on regular basis		.5910	.6029*	.6435*
2 Serious handicap or chronic illness		.0000	.0000	.0000
Sexual behavior				
0 No apparent dysfunction		.8162**	.7626	.8277**
3 Real or perceived situational or minor problems		.8271*	.8229	.9382**
5 Real or perceived chronic or severe problems		.0000	.0000	.0000
PPO's impression of needs				
-1 Minimum		.0000	.0000	.0000
0 Low		.2783	-.0961	-.1452
3 Medium		.0089	-.2727	-.3113
5 Maximum		.3227	-.1082	-.1317
Prior conviction for violent offense				.0751
Prior conviction for drug offense				.0807
Weapon used during commission of current offense				.0858
Age at intake				-.0270***
Married				-.1525*
Living with friends				-.3403
Probationer (not parolee)				-.1144
Male				.1464
White				-.0609
Hispanic				.1779
African American				.3519*
Length of follow up period				.0090***
Number of Observations	886	886	886	886
Deviance	1986.8550	2046.7852	1883.0902	1758.4464
Degrees of Freedom	865	854	834	822

*** p<.001 ** p<.01 * p<.05

In addition to the Poisson regression, the same series of models are estimated using the Negative Binomial model. The purpose of this second set of regressions is to account for an excess of clients with no re-arrests, relative to the expected number under the poisson assumptions. One of the limitations of Poisson regression is that when there are many zeros in the dependent variable (many people without a subsequent arrest), it tends to under-predict the number of zeros. In that case, Negative Binomial regression can be more appropriate. Generally, the difference in the results between the two techniques when there are many zeros is fewer statistically significant variables. Indeed, that is the case here as seen below.

Negative binomial regression results

The results of the negative binomial regression are presented in Table 3.10 for all four models as in the poisson analysis. Like the poisson analysis, the final model including all risk and needs items, along with the additional information collected on clients, is the best fitting model. Our discussion of the results, therefore, will focus only on Model 4 in the table.

As hinted at, nearly all RNA items and additional information in Model 4 of Table 3.10 are not statistically significant. The only ones which are: *address changes*, *other drug usage problems*, *number of prior probation/parole revocations*, and *age at intake*. In all cases, the direction or pattern of the effect is as expected.

Clients with no address changes are predicted to have 24% fewer re-arrests on average than clients with address changes. Clients with no drug problems are predicted to have 57.9% as many re-arrests on average as clients with drug problems. Clients with one or more prior probation or parole revocations is predicted to have 35.3% more re-arrests on average than clients without a prior revocation. Finally, the older a client is at intake, the fewer re-arrests they experience on average.

While the negative binomial model fits the data better than the poisson, it does so at an odd cost of failing to identify factors that predict the level of recidivism in the client sample. This is a heavy cost, and could be due to problems of multicollinearity (high correlations amongst the independent variables) which are exacerbated with the models attempt to better estimate the number of clients with no arrest. We need to apply experience and judgement to these analyses when we engage in the next step.

Table 3.10 - Initial Assessment Negative Binomial Regression Results

Independent Variable	Model 1 (Risk scores only) neg binomial	Model 2 (Need scores only) neg binomial	Model 3 (Full RNA) neg binomial	Model 4 (RNA plus) neg binomial
Constant	1.7263***	-4.3450*	-2.6783	-2.1740
Address changes N/S				
0 None	-.2820*		-.2384	-.2711*
2 One	-.1447		-.1227	-.1208
3 Two or more	.0000		.0000	.0000
Percentage of time employed				
0 60% or more	-.0029		.1553	.2200
1 40%-59%	.1028		.1498	.1728
2 Under 40%	.0000		.0000	.0000
Alcohol usage problems				
0 No interference with functioning	-.0499		-.1539	-.2599
2 Occasional abuse: some disruption of functioning	.0542		-.0884	-.1110
4 Frequent abuse: serious disruption, needs treatment	.0000		.0000	.0000
Other drug usage problem				
0 No interference with functioning	-.6161***		-.4975	-.5466*
1 Occasional abuse: some disruption of functioning	-.1886		-.1744	-.2022
2 Frequent abuse: serious disruption: needs treatment	.0000		.0000	.0000
Attitude				
0 Motivated to change, receptive to assistance	-.0549		-.0275	-.1672
3 Dependent or unwilling to accept responsibility	-.0927		-.0870	-.2170
5 Rationalizing behavior, negative, not motivated	.0000		.0000	.0000
Age at first adjudication				
0 24 or older	-.2875*		-.1744	.1336
2 20 to 23	.0202		.0686	.1523
4 19 or younger	.0000		.0000	.0000

Independent Variable	Model 1 (Risk scores only) neg binomial	Model 2 (Need scores only) neg binomial	Model 3 (Full RNA) neg binomial	Model 4 (RNA plus) neg binomial
Number of prior periods of probation/parole				
0 None	-.1960		-.2079	-.2388
4 One or more	.0000		.0000	.0000
Number of prior probation/parole revocations				
0 None	-.4260**		-.3515**	-.3024*
4 One or more	.0000		.0000	.0000
Number of prior felony convictions				
0 None	-.0830		-.1098	-.2293
2 One	-.1933		-.1952	-.2947
4 Two or more	.0000		.0000	.0000
Conviction or juvenile adjudications for				
0 None	-.3090		-.3619	-.3103
2 Burglary, theft, auto theft or robbery	-.1051		-.1655	-.1456
3 Worthless checks or forgery	-.3529		-.3247	-.1619
4 Both categories	.0000		.0000	.0000
Conviction or juvenile adjudication for assault in last 5 years				
0 No	.0956		.0706	-.1752
15 Yes	.0000		.0000	.0000
Academic/vocational skills				
-1 High school or above		.0000	.0000	.0000
0 Adequate skills: able to handle everyday requirements		.2175	.2782*	.1576
2 Low skill level causing minor adjustment problems		.4128**	.4213***	.2609
4 Minimal skill level causing serious adjustment problems		.1656	.2491	.0425
Employment				
-1 Satisfactory employment for one year or more		.0000	.0000	.0000
0 Secure employment: no difficulties reported		.3106	.2425	.1838
3 Unsatisfactory employment/unemployed but has adequate job skills		.4937	.3944	.3136
6 Unemployed and virtually unemployable		.5121	.4583	.3749
Financial Management				
-1 Long standing pattern of self-sufficiency		.0000	.0000	.0000
0 No current difficulties		1.8638	1.9075	2.0428
3 Situational or minor difficulties		1.7158	1.7690	1.9803
5 Severe difficulties		1.7844	1.8115	2.0408
Marital/family relationships				
-1 Relationships and support exceptionally strong		.0000	.0000	.0000
0 Relatively stable relationships		.0735	-.0339	.0735
3 Some disorganization or stress but potential for improvement		.0156	-.0947	.0270
5 Major disorganization or stress		-.2383	-.2885	-.1349
Companions				
-1 Good support and influence		.0000	.0000	.0000
0 No adverse relationships		1.6129	1.4375	1.2217
2 Associations with occasional negative results		1.8258	1.5515	1.2741
4 Associations almost completely negative		1.9866	1.6303	1.3178
Emotional stability				

-2 Exceptionally well adjusted; accepts responsibility for actions		.0000	.0000	.0000
0 No symptoms of emotional instability		-.3276	-.2127	-.0689
4 Symptoms limit but do not prohibit adequate functioning		-.1602	-.0497	.0800
7 Symptoms prohibit adequate functioning		-.6879	-.6538	-.5553
Alcohol usage				
0 No interference with functioning		-.0009	.0785	.0965
3 Occasional abuse; some disruption of functioning		.0621	.1231	.1482
6 Frequent abuse; serious disruption, needs treatment		.0000	.0000	.0000
Independent Variable	Model 1 (Risk scores only) neg binomial	Model 2 (Need scores only) neg binomial	Model 3 (Full RNA) neg binomial	Model 4 (RNA plus) neg binomial
Other drug usage				
0 No interference with functioning		-.4777**	-.0198	.1487
3 Occasional abuse, some disruption of functioning		-.0278	.0623	.0686
5 Frequent abuse, serious disruption, needs treatment		.0000	.0000	.0000
Mental ability				
0 Able to function independently		-.2607	-.5187	-.4854
3 Some need for assistance, potential for adequate adjustment		-.1076	-.2905	-.3084
6 Deficiencies severely limit independent functioning		.0000	.0000	.0000
Health				
0 Sound physical health, seldom ill		1.0108**	1.0538**	.7638
1 Handicap or illness interferes with functioning on regular basis		.7558	.8758*	.7901
2 Serious handicap or chronic illness		.0000	.0000	.0000
Sexual behavior				
0 No apparent dysfunction		.8369	.7594	.8554
3 Real or perceived situational or minor problems		.9095	.8875	.8881
5 Real or perceived chronic or severe problems		.0000	.0000	.0000
PPO's impression of needs				
-1 Minimum		.0000	.0000	.0000
0 Low		-.3102	-.5255	-.6325
3 Medium		-.6308	-.7917	-.8398
5 Maximum		-.3008	-.6682	-.6900
Prior conviction for violent offense				.0213
Prior conviction for drug offense				.1091
Weapon used during commission of current offense				.0816
Age at intake				-.0283***
Married				-.1764
Living with friends				-.3059
Probationer (not parolee)				-.1208
Sex 1				-.1552
White				-.0883
Hispanic				.1458
African American				.4208
Length of follow up period				.0081**
Number of Observations	886	886	886	886
Deviance		812.5875	794.9601	774.9918
Degrees of Freedom	.9123	.9515	.9532	.9428

*** p<.001

** p<.01
* p<.05

In this section, we have described the results of the last series of analyses conducted to validate the initial assessment of the RNA. The ultimate purpose of all of these analyses is first, to determine whether the RNA as it is currently written is valid for the State of New Mexico. Second, if it is not, to recommend changes to the current RNA. These issues are addressed in the next section.

Section Four - Results of Validation Check for the Initial RNA

The purpose of this section is to present our conclusions regarding the validity of the initial RNA. The results of all of the analyses which have been completed are compared, and decisions regarding the overall validity of the instrument as well as the validity of each of the items are discussed. Additionally, a draft of a revised RNA to be used at the initial assessment is included.

Is the instrument valid?

One of the first questions we asked when we completed each set of analyses with each of the outcome measures (technical violations, successful completion of probation/parole, whether there were subsequent arrests and number of subsequent arrests) was whether overall the instrument placed offenders into a supervision level that was consistent with the outcome. In general, we discovered that indeed, the instrument did perform as expected. Those classified into higher levels of supervision had worse outcomes while those classified into lower levels of supervision were associated with better outcomes. However, as expected, the instrument did not predict perfectly. For example, 35% of those classified as minimum security were arrested after supervision began. This indicates the percentage of false negatives. Conversely, of the 551 offenders classified as requiring maximum supervision, 182 were not arrested for any other crimes during the follow up period. This may indicate that some of these individuals were supervised at a level higher than was necessary as measured by recidivism (false positives). One question is whether this amount of error is normal for a valid instrument. According to Champion (1994), unofficial error margins of 30% or less are acceptable (p. 206). Is this margin of error acceptable in New Mexico, and if not, can the RNA be improved to reduce this error. In addition, can a revised instrument improve upon this margin or error.

We have also observed that this instrument tends to place the majority of offenders in maximum supervision. It may be that this is appropriate for the State of New Mexico and that most of the offenders who are convicted in this state are high risk. Alternatively, it may be that the instrument is overpredicting the number of offenders who are high risk. The problem with this is high risk offenders use up the state's limited resources. Thus, if the instrument is overpredicting the number of high risk offenders, the state may be using money and manpower on offenders who do not need to be supervised at such a high level. Additionally, the risk and needs portion predict differently. Most offenders are placed into maximum supervision by risk scores, but medium supervision by needs scores.

When we examined each item to determine how well they predicted risk, we found that some items never predicted risk, no matter which outcome measure was used or which statistical technique was used. Clearly, these items are not valid. Other items sometimes predicted risk, depending on outcome or statistical technique. Still others always or almost always predicted risk. These items are clearly valid. Based on these comparisons, the next section addresses the changes we recommend for each of the items.

Procedure used to compare the results

The following procedure is used to determine which items consistently predict risk well and among those that do not, which items need to be changed or possibly eliminated from the RNA. We began by constructing a table which compares the results of each of the analyses. This is attached in Appendix A. This allowed us to compare each of the analyses with each of the criterion measures. By looking at this table, we first identified items which always predict risk. We also looked for categories within these items which predict risk consistently. Second, we looked for items which had specific categories which predict risk. Third, we searched for items which never predict risk. Fourth, we looked for items that never predict risk in the bivariate situation. Since this instrument is additive, if an item does not predict risk in the bivariate, it does not make sense to include it, unless the issues for keeping the item are theoretical, substantive or even political. Fifth, we explored items which had inconsistent results. This included items which only predict some types of risk. Additionally, items which predict all types of risk at least in the bivariate, but are only sometimes significant in the multivariate models are included here as well.

Results of comparisons and recommended changes

The results of this synthesis and recommendations are discussed next. We have included a table summarizing the recommendations for each item (see Table 4.1).

Items which always predict risk

There are no items which predict every outcome measure with every model. However, there are two items which always predict risk as measured by any of the criteria, although not for every model. First, is the number of *prior revocations*. We recommend that this item be included in subsequent drafts of the RNA as it is currently written. Second, the number of *prior periods of probation/parole* is always statistically significant. We recommend that this item not be changed.

Items with specific categories which predict risk consistently

The item measuring *prior property offenses* had one category which predicted each measure of risk consistently. Specifically, prior adjudications for burglary, theft, auto theft or robbery predict risk consistently. However, prior adjudications for worthless checks or forgery does not predict risk. The category which includes both sometimes predicts risk. It is likely that it does because that category also captures the burglary, theft, etc. offenses. Thus, we suggest that this item be altered to include only prior convictions for burglary, theft, auto theft or robbery.

Items which never predict risk

There are two items which never predict risk due to lack of statistical significance or because the direction of the relationship is opposite of that expected. These items are conviction for *assault within the last five years* and *physical health*. Recall that the *assault* item is included on the Wisconsin RNA because it is Wisconsin's policy to place offenders with a recent assault conviction into maximum supervision initially. However, this is not New Mexico's policy. Thus, it makes sense that this item does not predict risk. We suggest that this item be eliminated from the RNA.

As noted earlier, it is expected that, if valid, the scoring of the items will have a linear relationship with the outcome (recidivism). Because the item measuring *physical health* does not, we believe that it should be removed from the RNA. Additionally, very few clients have chronic health problems.

Items which never predict risk in the bivariate analyses

Two items never predict risk in the bivariate situation. These are *marital/family relationships* and *mental ability*. We recommend these items be eliminated from the RNA.

Items which did not predict risk consistently

Included in this category are those items which did not predict every type of risk. It is not surprising that there are items which do not predict every type of risk in every model since the criterion measures differ and are only somewhat related to one another.

Additionally, there are items which may have predicted each type of risk at least in the bivariate situation, but did not always predict risk in the multivariate. Moreover, sometimes only some of the categories of these items predict risk while all of the categories predict other risk measures. Most items had inconsistent results. We begin by discussing those items which predicted only some types of risk. Next, we examine those items that predict all types of risk, at least in the bivariate, but had inconsistent results otherwise.

Items which predicted only some types of risk

The *number of address changes* predicted each measure of risk except whether there is a subsequent arrest (in either the bivariate or multivariate analyses). In some instances, only the category indicating that two or more address changes had occurred is statistically significant. In others, particularly for the models trying to predict the number of subsequent arrests, the key category is no address changes vs. any address change (that is...combine the other two categories). Moreover, bivariate results indicate that one address change does not differentiate between those who pose a risk and those who do not.

Although the amount of *time employed* is always statistically significant in the bivariate, it did not always predict risk in the multivariate models including whether there are any subsequent arrests and the number of subsequent arrests (with the exception of the fourth Poisson model-probably a chance occurrence). Moreover, when it is significant, the item does not always predict as expected (sometimes the direction is opposite than the direction expected). One reason for this may be that the categories should be altered. Another possibility is that the results are confounded by having near duplicate items in the risk and needs portion. We recommend eliminating the duplication and leaving the item as is.

Alcohol usage has inconsistent results. This item never predicts whether the offender successfully completed probation/parole when included in the risk portion of the RNA. However, it did predict risk when included in the needs portion, suggesting this item is not being measured consistently. This item never predicts risk when the criterion is the number of

subsequent offenses. Additionally, when the item does have some statistically significant relationship with the other risk measures, most of the time only the category occasional use rather than frequent use is associated with increased risk when it is in either the risk or needs portion. This suggests that there is not a linear relationship between the scores and risk. Further, alcohol use could be difficult item for officers to accurately determine. Again, this is an item that might be affected by having a near duplicate in the needs portion of the instrument. Based on the results here, we might recommend that this item be eliminated from the RNA. However, we recognize that this item may be substantively important, and the results may be artificial. Thus, we recommend only a single item be kept.

The needs item measuring *employment* does not predict successful completion (except for the category unsatisfactory employment in the first logistic regression model). It predicts technical violations and subsequent arrests in the bivariate analyses only. This item is statistically significant in the Poisson model measuring the number of subsequent arrests, but not the negative binomial model. This item does not appear to predict risk well. This item may also be difficult for officers to measure regarding how the categories are defined and so they may not be used in a consistent manner. We suggest this item be deleted. However, if it is kept, the categories unsatisifactory employment and unemployed should be combined. These categories appear to predict risk similarly and do not need to be kept separate.

The item *financial management* does not prove to be a good predictor of technical violations or number of subsequent offenses. However, the item does predict recidivism in the bivariate and the multivariate analyses. But the key distinction here is between clients with a stable financial history vs. clients with some level of difficulties. The item should be kept, but the final three categories combined.

The item measuring *emotional stability* does not predict whether there are any subsequent arrests or the number of subsequent arrests. While it does not predict technical violations in the bivariate, it does predict it in some of the multivariate Poisson models. This item does not appear to predict risk well. We recommend that this item not be included in the RNA. Like other items emotional stability is a more subjective item and may be difficult to ascertain.

Finally, *sexual behavior* does not predict the number of technical violations, whether there are any subsequent arrests or the number of subsequent arrests. It does predict whether the client completes successfully, but only the category chronic or severe problems is significant and in the opposite direction of that expected. Thus, we propose that this item does not predict risk well and should be dropped.

Items which predicted all types of risk, but not significant in all statistical models

Other drug usage predicts risk inconsistently. While this item predicts every type of risk in at least one of the analyses performed, it is not always significant, nor are all the categories always significant. For example, when the criterion is successful completion of probation/parole, only frequent drug usage predicts risk. However, when significant, this item tends to predict risk as it is currently written. Therefore, we suggest that this item not be

altered, but the duplication across the risk and needs portion be eliminated.

Attitude is often not significant, and when it is, sometimes both categories significantly predict risk, and sometimes only one of the categories predicts risk. However, which category predicts risk is not consistent. It may be that this occurs because relatively few people fall into the last category. It may also be an item that is prone to differential use because of its subjective assessment. We will err on the side of caution, and suggest this item remain the same until the validation check on the revised RNA is completed, at which time we may recommend this item be altered or deleted.

The item *age at first adjudication* is not a significant predictor of risk in every model, but does predict each measure of risk in the bivariate and one of the multivariate analyses. Additionally, in most models, all of the categories are statistically significant. When the outcome is successful completion the less than nineteen years old category is the only significant predictor of risk. However, this item tends to predict risk more often than not as it is currently written. We recommend this item not be altered.

The *number of prior felony convictions* is always significant in the bivariate analyses, but not in the majority of the multivariate analyses. Additionally, only two or more felony convictions are significant when the outcome is the number of subsequent technical violations. Like the previous item, this item may not be the best predictor of risk when other items are included. However, since this item is statistically significant in more than one multivariate analysis, we suggest that this item remain on the RNA unless the validation of the revised RNA indicates that it should be eliminated.

The needs item measuring *academic/vocational skills* often predicts risk but sometimes only low skills was significant. Additionally, there may not be a linear relationship with some of the risk measurements. For example, the average number of technical violations is lower for those with minimal skills as compared to those with low skills. It is likely that the reason this occurs is that there are so few people with low skills. Although there does not seem to be a significant difference between high school and adequate skills, there does appear to be some difference between these two categories. For example, the current analyses indicates that the number of subsequent arrests are higher for those with adequate skills as compared to those with a high school education. Moreover, the coefficient for adequate skills in the logistic model is positive, indicating that those with adequate skills are more likely to have a subsequent arrest as compared to those with a high school education. Since this item does tend to predict each type of risk it should be kept. However, the categories low and minimal skills should be combined.

Next, the item measuring *companions* predicts all types of risk in many of the models. One change that needs to be considered is combining the good support and no adverse relationships categories. One reason for this is that there are so few people that fall into the good support category that these two categories predict risk similarly. Therefore, we suggest these two categories be combined.

Finally, the item measuring the *PPOs impression of the client's needs* predicts all types of risk, but not all categories predicted risk, nor is it statistically significant in all models. There is no difference between low and minimal needs for most outcome measures. Moreover, those identified as having medium needs are less likely to be re-arrested. This item as it is currently written does not appear to predict risk well. As in other items this may be partially a result of the subjective assessment of the item. It may be more useful to include an **open question** which asks for the PPOs impression of the **type** of risk the client poses rather than the needs the client has. If it is decided that this item should be kept, we suggest that the categories be changed to medium needs or less and maximum needs.

Table 4.1 - Recommended Changes to RNA Items

Item	**Recommended changes**
Address changes	Combine one address change and two or more changes into a single category
Time employed	No change, but eliminate duplication.
Alcohol usage problems	No change, but eliminate duplication.
Drug usage problems	No change, but eliminate duplication.
Attitude	No change
Age at first adjudication	No change
Number of prior periods of probation/parole	No change
Number of prior revocations	No change
Number of prior felony convictions	No change
Conviction for property offenses	Combine categories to create 2-category version that contrasts those with a prior arrest for burglary, theft, motor vehicle theft or robbery vs. those without.
Conviction for assault in last five years	Eliminate
Academic/vocational skills	Combine low and minimal skills categories
Employment	Eliminate
Financial management	No change
Marital/family relationships	Eliminate
Companions	Combine good support and no adverse relationships categories
Emotional stability	Eliminate
Mental ability	Eliminate
Physical health	Eliminate
Sexual behavior	Eliminate
PPOs impression of client's needs	Eliminate; if kept, convert to open ended question about what type of risk the client poses, or what kinds of needs the client requires.*

*Some items may be substantively important and it may be decided that those items should not be eliminated for those reasons

Summary of changes to initial RNA

First, we recommend that the risk and needs sections of the RNA be combined. In general, the analyses suggested that the needs section is less predictive of risk than the risk portion of the instrument. Moreover, there are particular items which should not be included on the instruments, suggesting a more parsimonious instrument be constructed. The only item not currently included on the RNA which consistently predicted risk is age at intake. Other items which are not able to be measured due to the lack of consistent documentation in the probation/parole files may also be considered for inclusion in subsequent versions of the RNA. For example, previous or current gang involvement may be a good predictor of risk.

The revised RNA questions are presented below. Note that none of the categories are scored. This is because the scoring will have to be determined when the validation of the revised RNA is completed. The validation of the revised RNA will be completed once recommended changes are approved. Additionally, new cutoff scores will have to be determined based on the validation of the revised RNA.

Table 4.2 - Revised RNA

Revised RNA questions	
Number of address changes in the last 6 months	None One or more
Percentage of time employed in the last 12 months	60% or more 40% to 59% Under 40%
Drug usage problems	No interference with functioning Occasional abuse: some disruption of functioning Frequent abuse: serious disruption, needs treatment
Attitude	Motivated to change, receptive to assistance Dependent or unwilling to accept responsibility Rationalizes behavior, negative, not motivated to change
Age at first adjudication	24 or older 20 to 23 years old 19 or younger
Number of prior probation/parole revocations	None One or more
Number of prior felony convictions	None One

	Two or more
Prior convictions for burglary, theft, auto theft or robbery	None One or more
Academic/vocational skills	High school or above skill level Adequate skills: able to handle everyday requirements Low or minimal skill level
Companions	No adverse relationships Associations with occasional negative results Associations almost completely negative

Section Five - Final Reassessment Results

This section presents the results of the validation of the final reassessment of the RNA. Since the automated data received from probation and parole includes only the final reassessment, this reassessment is used for validation. Only one criterion of risk, recidivism, is used to validate the reassessment. Although it may be useful to analyze how well the reassessment predicts other measures of risk like technical violations, because we use the final reassessment this is not possible. One can only predict something that happens in the future so attempting to predict something that has already occurred is not possible and causality cannot be inferred.

Table 5.1 illustrates the percentage of the clients who are arrested after supervision ends. Approximately 46% of the clients are arrested after supervision ends. These numbers indicate that the base rate of recidivism for this sample is close to 50-50 for those arrested after supervision ends.

Table 5.1 - Percent Arrested After Supervision Ended

	No	Yes
Arrested after supervision ended	53.9%	46.1%

Tables 5.2 and 5.3 illustrate the proportion of clients who have at least one arrest after supervision ends by final computed and assigned levels of supervision. The instrument tends to be able to differentiate between clients who will recidivate and those who do not (an increasing proportion of clients recidivate as supervision level increases).

Table 5.2 - Subsequent Arrest (after supervision ended) by Final Computed Supervision Level

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	71.7%	58.3%	31.8%	493
Subsequent arrests	28.3%	41.7%	68.2%	422
Total N	311	290	314	915
Mean number of subsequent arrests***	.57 (1.50)	.89 (1.51)	1.96 (2.23)	1.14 (1.88)

p<.001

While the percentage of clients who are re-arrested increases with increasing levels of assigned supervision, the differences are not as great as computed supervision levels. For example, the percentage of clients who are computed to minimum supervision by the RNA and who are

subsequently arrested is 28% while 34% of those assigned to minimum supervision are re-arrested.

Table 5.3 - Subsequent Arrest (after supervision ended) by Final Assigned Supervision Level

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	66.2%	62.2%	34.2%	494
Subsequent arrests	33.8%	37.8%	65.8%	419
Total N	281	328	304	913
Mean number of subsequent arrests***	.66 (1.41)	.77 (1.42)	1.95 (2.36)	

$p < .001$

We also assessed how well each portion of the reassessment predicted recidivism overall (see Tables 5.4 and 5.5). We discovered that the two portions predict similarly. For example, both portions are associated with a false positive error rate of approximately 30%. However, the proportion of cases assigned to each level of supervision differs. The risk portion places the greatest proportion (48%) of offenders into minimum supervision, while the needs portion places most offenders in either minimum (40%) or medium (36%) supervision. The risk portion only places 19% of offenders in medium supervision. This difference may account for the difference in the average number of offenses committed by each group. Offenders placed in medium supervision by the risk portion are arrested an average of .96 times while those placed in medium supervision by the needs portion are arrested an average of 1.19 times.

Table 5.4 - Subsequent Arrests by Computed Risk Portion of Reassessment

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	69.8%	54.8%	31.0%	497
Subsequent arrests	30.2%	45.2%	69.0%	418
Total N	441	177	297	915
Mean number of subsequent arrests***	.63 (1.52)	.96 (1.52)	1.98 (2.24)	1.13 (1.88)

Table 5.5 - Subsequent Arrest by Computed Needs Portion of the Reassessment

	Minimum supervision	Medium supervision	Maximum supervision	Total N
No subsequent arrests	69.8%	52.3%	30.9%	495
Subsequent arrests	30.2%	47.7%	69.1%	420
Total N	364	331	220	915
Mean number of subsequent arrests***	.60 (1.49)	1.19 (1.84)	1.97 (2.20)	1.14 (1.88)

We now perform the same bivariate analyses on the reassessment as was done with the initial assessment. Crosstabulations of each risk and need item against recidivism (any subsequent re-arrest) are presented. Additionally, the mean number of re-arrests for each category of each risk and need item is also reported. Table 5.6 contains results from both bivariate analyses.

Risk reassessment items
All risk items have statistically significant associations with recidivism defined as any re-arrest subsequent to ending probation/parole supervision. We begin by describing the risk items which do not have results contrary to expectations and therefore appear to be able to differentiate between recidivists and non-recidivists. This includes all but one risk reassessment item.

First, the item *address changes* has a significant and clear pattern of differentiation between recidivists and non-recidivists. The fewer the number of address changes, the smaller the proportion of clients with subsequent arrests. For those clients with no address changes, only 39.3% had a re-arrest while 60.2% of clients with two or more address changes had re-arrests. Note that this item was not statistically significant for the initial assessment.

Age at first conviction also differentiates recidivists and non-recidivists. Of those clients whose first conviction was at age 24 or older, only 32.2% were re-arrested, while 49.7% and 58.2% of clients were re-arrested when their first conviction occurred between the ages of 20 to 23, or 19 or younger, respectively.

Two items pertaining to past criminal behavior, *number of prior probation/parole revocations* and *number of prior felony convictions* also predict recidivism. Clients with no revocation had a likelihood of a subsequent arrest of 38.4%, while 64.5% of clients with one or more revocations had subsequent arrests. Thirty-eight-point-seven percent (38.7%) of clients with no prior felonies had subsequent arrests, while 56.6% and 64.5% of clients with one felony prior and two or more prior felonies, respectively, had subsequent arrests.

A third item pertaining to past criminal behavior had results contrary to the expectations embedded in the reassessment scoring system. *Conviction or juvenile adjudication* has two middle categories scored in such a way as to suggest that convictions or adjudications for burglary, theft, motor theft or robbery (scored a 2) are less indicative of risk than are convictions or adjudications for forgery or passing worthless checks (scored a 3). The proportion of clients with subsequent arrests in these two categories is 58.3% and 40.0%, respectively. There is actually a clear pattern in the subsequent arrest rates for this item that suggest collapsing the categories "none" and "worthless checks or forgery" into a single category which is to be contrasted with a category indicating any conviction or adjudication for "burglary, theft, auto theft, or robbery." Note that this pattern is also clearly apparent in the mean number of arrests for each of the categories.

We found that the *percentage of time employed* does appear to differentiate between those who recidivate and those who do not. Clients employed "more than 60% of the time" had less than a 40-60 likelihood of a subsequent arrest (38.1% had arrests). This proportion rises to 50.4% and 62.6% for clients working "between 40% to 59% of the time" and "less than 40% of the time", respectively.

Alcohol usage problems also differentiated clients according to re-arrest rates. About 40% of clients with no problems were arrested, while nearly 54% of clients with occasional abuse problems and 63% with frequent abuse problems had subsequent arrests. *Drug abuse problems* followed the same rough pattern, although the proportion of clients at the high end of the abuse spectrum experience more arrests.

Two reassessment items pertaining to living conditions ("problems with current living situation") and social relations ("social identification") follow. Those clients with "relatively stable [living situation]" experienced only 37% recidivism, while those with "major disorganization or stress" recidivated at a rate of nearly 70 percent (69.8%). The "social identification" item likewise differentiated recidivists: only 38.4% of clients that identified "mainly with non-criminally oriented persons" had subsequent arrests, but that rises to 70% when the clients identified "mainly with delinquent persons."

The final risk reassessment item, *response to court or division imposed conditions*, considers how a client's response to restrictions and conditions imposed while on probation or parole predict subsequent recidivism. The pattern is that the greater the unwillingness to comply, the greater the rate of recidivism, from 33.8% for clients with no problems to 68.3% for clients unwilling to cooperate.

Need reassessment items

The need portion of the reassessment contains several items that do not perform as expected. This was true for the needs portion on the initial assessment, and remains so here. At least some part of the expected results can be attributed to the "hybrid" nature of the needs items which attempt to ascertain risk as well as ascertain program needs. One possible recommendation is to adapt those need items which predict risk into a revised risk assessment

instrument, while those which do not predict risk be removed for inclusion in a revised and **separate** needs assessment instrument. The analysis presented here focuses on the predictive power of the needs items.

The first two items, *use of community resources* and *academic/vocational skills*, are both statistically significant. With the first item, the lowest rate of recidivism (36.8%) corresponds to those clients who did "not need or productively utilized" community resources. The two categories with the highest rate of recidivism are "needed but not available" (57.1%) and "utilized but not beneficial" (65.1%). The recidivism rates do not parallel item scoring, indicating it is not as useful for risk prediction. The second item does parallel category scoring; the weaker the academic or vocational skills of a client, the higher the rate of recidivism.

The next seven needs reassessment items all follow the pattern inherent in their scoring. For example, for the item *employment*, the better a client's employment situation, the lower the rate of recidivism, ranging from a low of 24.6% for clients with "satisfactory employment for one year or more" to a high of 61.9% for clients who are "unemployed and virtually unemployable." It is useful to note that there is no sizeable difference in the recidivism rate for the two categories signifying the worst employment situation.

The next item, *financial management*, contains the most striking bivariate result of all the various analyses in this report. Clients that have a "long standing pattern of self-sufficiency" have a minuscule 6.3% recidivism rate. This rate jumps to 37.9% for clients with "no current difficulties," to 51.3% for those with "situational or minor difficulties", and finally to 57.4% for clients with "severe difficulties."

Social relationships, the area considered by the next two items, also follows the expected pattern and item scoring. For *marital/family relationships*, clients with "exceptionally strong" relationships have a recidivism rate of 30%, while recidivism rises to 58.5% for those with "some disorganization or stress but potential for improvement" and 68% for those clients with "major disorganization or stress." The role of *companions* is evident in the growing rate of recidivism from clients with "good support and influence" (25%) to "associations almost completely negative" (76%).

The most interesting aspect of the next item, *emotional stability*, is that the top two categories, "symptoms limit but do not prohibit adequate functioning" and "symptoms prohibit adequate functioning" have nearly identical rates of recidivism, 61.6% and 60%, respectively. Thus, these two categories might be able to be combined without loss of predictive power.

The two substance abuse reassessment items have similar rates of recidivism. For *alcohol usage*, going from "no interference" to "occasional abuse" to "frequent abuse" the rates of recidivism rise from 38.6% to 55.3% to 64.7%. The recidivism rates for the same three categories of the *other drug usage* item are quite similar, 37.7%, 58%, and 73.6%, respectively. Greater abuse is associated with greater recidivism.

The next three items, *mental ability*, *health*, and *sexual behavior* do not have statistically significant associations with recidivism. This is similar to how these needs items performed on the initial assessment. They do not seem to relate to risk prediction, but have apparent direct relevance for needs assessment.

Finally, the *PPO's impression of client needs* is statistically significant, and displays the expected pattern. Clients that PPOs rate as having minimum needs have a 27.8% recidivism rate. Those rated as having low, medium, and maximum needs have recidivism rates of 30.7%, 42%, and 67%, respectively. At least in the final reassessment, PPOs do seem to be able to discriminate reasonably well those clients likely to be re-arrested from those not likely to be re-arrested. This may be partially a result of the PPOs contact and familiarity with the client while they were under supervision.

It is once again important to keep in mind that the above results are for a series of bivariate analyses where each risk or need item was considered in isolation from the others. The overall level of statistical significance was promising, as was the result that in general the expected patterns were displayed. Likewise, these patterns are seen in the mean number of re-arrests for each category of the risk and need items. However, the multivariate analysis will consider all risk and need items simultaneously, accounting for relationships amongst the RNA reassessment items. This is a better approach for decision-making on RNA instrument revision that is the bivariate analysis.

Table 5.6 - Subsequent Arrests (after supervision ended) by Each Reassessment Item

	No Subsequent arrests	**Subsequent arrests**	**Average number of subsequent arrests**	**Significant pairs**
Risk items				
Address changes				
0 None	60.7%***	39.3%	.91 (1.64)***	0, 2
2 One	46.9%	53.1%	1.35 (2.15)	0, 3
3 Two or more	39.8%	60.2%	1.69 (2.12)	
Age at first conviction				
0 24 or older	67.8%***	32.2%	.79 (1.75)***	0, 3
1 20-23	50.3%	49.7%	1.14 (1.74)	
3 19 or younger	41.8%	58.2%	1.50 (2.00)	
Number of prior probation/parole revocations				
0 None	61.6%***	38.4%	.86 (1.56)***	all
2 One or more	35.5%	64.5%	1.83 (2.37)	
Number of prior felony convictions				
0 None	61.3%***	38.7%	.82 (1.54)***	0, 1
1 One	43.4%	56.6%	1.57 (2.05)	0, 3
3 Two or more	35.5%	64.5%	2.01 (2.53)	
Conviction or juvenile adjudications for				
0 None	59.7%***	40.3%	.90 (1.66)***	0, 1
1 Burglary, theft, auto theft or robbery	41.7%	58.3%	1.64 (2.24)	0, 3
2 Worthless checks or forgery	60.0%	40.0%	.99 (1.66)	1, 2

	No Subsequent arrests	Subsequent arrests	Average number of subsequent arrests	Significant pairs
3 Both categories	40.0%	60.0%	1.74 (2.17)	
Percentage of time employed				
0 60% or more	61.9%***	38.1%	.82 (1.57)***	0, 1
1 40-59%	49.6%	50.4%	1.54 (2.43)	0, 2
2 Under 40%	737.4%	62.6%	1.68 (2.02)	
Alcohol usage problems				
0 No interference with functioning	60.5%***	39.5%	.95 (1.84)***	0, 2
2 Occasional abuse; some disruption of functioning	46.2%	53.8%	1.40 (1.87)	0, 5
5 Frequent abuse; serious disruption; needs treatment	37.1%	62.9%	1.61 (1.99)	
Other drug usage problem				
0 No interference with functioning	61.9%***	38.1%	.85 (1.63)***	0, 1
1 Occasional abuse; some disruption of functioning	40.4%	59.6%	1.54 (1.97)	0, 2
2 Frequent abuse; serious disruption; needs treatment	32.6%	67.4%	2.01 (2.43)	
Problems with current living situation				
0 Relatively stable relationships	63.0%***	37.0%	.83 (1.68)***	all pairs
3 Moderate disorganization or stress	45.9%	54.1%	1.32 (1.78)	
5 Major disorganization or stress	30.2%	69.8%	2.14 (2.43)	
Social identification				
0 Mainly w/non-criminally oriented persons	61.6%***	38.4%	.88 (1.67)***	all pairs
3 Mainly w/delinquent persons	30.0%	70.0%	1.97 (2.25)	
Response to court or division imposed conditions				
0 No problems of consequence	66.2%***	33.8%	.69 (1.48)***	all pairs
3 Moderate compliance problems	51.5%	48.5%	1.24 (1.83)	
5Has been unwilling to comply	31.7%	68.3%	1.98 (2.31)	
Needs items				
Use of community resources				
0 Not needed or productively utilized	63.2%***	36.8%	.81 (1.60)***	0, 3
2 Needed but not available	42.9%	57.1%	1.57 (1.81)	0, 4
3 Utilized but not beneficial	34.9%	65.1%	1.67 (1.97)	
4 Available but rejected	54.2%	45.8%	2.12 (2.40)	
Academic/vocational skills				
-1 High school or above	64.3%***	35.7%	.81 (1.59)***	-1, 2
0 Adequate skills: able to handle everyday requirements	55.7%	44.3%	1.10 (1.94)	0, 2
2 Low skill level causing minor adjustment problems	41.1%	58.9%	1.57 (2.00)	
4 Minimal skill level causing serious adjustment problems	35.7%	64.3%	1.50 (1.69)	
Employment				
-1 Satisfactory employment for one year or more	75.4%***	24.6%	.46 (.92)***	-1, 3
0 Secure employment: no difficulties reported	62.1%	37.9%	.83 (1.59)	-1, 6
3 Unsatisfactory employment/unemployed but has adequate job skills	40.9%	59.1%	1.58 (2.10)	0, 3
6 Unemployed and virtually unemployable	38.1%	61.9%	2.17 (2.83)	0, 6
Financial Management				
-1 Long standing pattern of self-sufficiency	93.8%***	6.3%	.13 (.50)***	-1, 5
0 No current difficulties	62.1%	37.9%	.84 (1.66)	0, 3
3 Situational or minor difficulties	48.7%	51.3%	1.32 (1.99)	0, 5
5 Severe difficulties	42.6%	57.4%	1.66 (2.05)	
Marital/family relationships				
-1 Relationships and support exceptionally strong	70.0%***	30.0%	.65 (1.14)***	-1, 5
0 Relatively stable relationships	63.4%	36.6%	.84 (1.79)	0, 3
3 Some disorganization or stress but potential for improvement	41.5%	58.5%	1.52 (1.88)	

	No Subsequent arrests	Subsequent arrests	Average number of subsequent arrests	Significant pairs
5 Major disorganization or stress	32.0%	68.0%	1.88 (2.14)	0, 5
Companions				
-1 Good support and influence	75.0%***	25.0%	.50 (.93)***	0, 2
0 No adverse relationships	62.9%	37.1%	.82 (1.61)	0, 4
2 Associations with occasional negative results	43.5%	56.5%	1.64 (2.12)	
4 Associations almost completely negative	24.0%	76.0%	2.07 (2.33)	
Emotional stability				
-2 Exceptionally well adjusted; accepts responsibility for actions	84.6%***	15.4%	.23 (.60)**	0, 4
0 No symptoms of emotional instability	56.6%	43.4%	1.06 (1.87)	
4 Symptoms limit but do not prohibit adequate functioning	38.4%	61.6%	1.59 (1.94)	
7 Symptoms prohibit adequate functioning	40.0%	60.0%	1.68 (1.75)	
Alcohol usage				
0 No interference with functioning	61.4%***	38.6%	.91 (1.75)***	0, 3
3 Occasional abuse; some disruption of functioning	44.7%	55.3%	1.38 (1.82)	0, 6
6 Frequent abuse; serious disruption, needs treatment	35.3%	64.7%	1.83 (2.35)	
Other drug usage				
0 No interference with functioning	62.3%***	37.7%	.83 (1.61)***	all pairs
3 Occasional abuse, some disruption of functioning	42.0%	58.0%	1.48 (1.92)	
5 Frequent abuse, serious disruption, needs treatment	26.4%	73.6%	2.29 (2.51)	
Mental ability				
0 Able to function independently	54.9% N/S	45.1%	1.11 (1.88) N/S	none
3 Some need for assistance, potential for adequate adjustment	40.9%	59.1%	1.66 (1.99)	
6 Deficiencies severely limit independent functioning	33.3%	66.7%	1.00 (.89)	
Health				
0 Sound physical health, seldom ill	54.2% N/S	45.8%	1.15 (1.91) N/S	none
1 Handicap or illness interferes with functioning on regular basis	51.9%	48.1%	.94 (1.36)	
2 Serious handicap or chronic illness	57.7%	42.3%	1.19 (1.67)	
Sexual behavior				
0 No apparent dysfunction	53.8% N/S	46.2%	1.15 (1.89) N/S	none
3 Real or perceived situational or minor problems	71.4%	28.6%	.50 (.85)	
5 Real or perceived chronic or severe problems	58.3%	41.7%	1.00 (.59)	
PPO's impression of client's needs				
-1 Minimum	72.2%***	27.8%	.56 (.92)***	-1, 5
0 Low	69.3%	30.7%	.70 (1.74)	0, 5
3 Medium	58.0%	42.0%	.91 (1.54)	3, 5
5 Maximum	33.0%	67.0%	1.91 (2.23)	

*** $p<.001$
** $p<.01$
* $p<.05$

Logistic regression results

The same hypotheses regarding the importance of each portion of the RNA are tested here as has been done previously. That is, we examine whether the risk portion of the instrument improves model fit, whether the needs portion improves model fit and whether the inclusion of other items improves model fit. By comparing Models 1 and Model 3, we found that the needs portion of the RNA does **not** improve the predictive efficacy of the model ($\chi^2 = 35.06$, df = 31). A comparison of Models 2 and 3 indicate that the inclusion of the risk items does predict

risk ($\chi^2 = 39.19$, df = 24, $p<.05$). Thus, Model 1 is preferred over Model 3. We then included the items not currently used on the RNA to determine whether they improve the fit of the model. By comparing Models 1 and 4 we can see that they do improve the model ($\chi^2 = 64.94$, df =12, $p<.001$).

Only one of the risk score items (*age at first conviction*) is statistically significant. This item is not significant in Model 4, most likely because of the similarity between it and the item measuring age at intake. Among the items not currently used on the RNA, three are statistically significant. These are *age at intake*, *living with friends,* and *whether the client was a probationer*. The negative relationship between *age at intake* and *whether the client was a probationer* are as expected. However, the relationship between *living with friends* and subsequent arrest is negative which is opposite of that expected. This means that clients who live with friends are less likely to be re-arrested than those who have other living arrangements (such as with family). One control variable, length of follow-up period, is statistically significant, indicating that the longer the follow-up period, the more likely it is that an offender will be re-arrested.

Table 5.7 - Logistic Regression Results - Final Reassessment

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
Constant	-1.1887	-3.1459	-3.1368	-.5344
Address changes				
One	.0964		.0784	.1218
Two or more	.0860		.0431	.1258
Age at first conviction				
20 to 23	.4224*		.4039	.0514
19 or younger	.5692**		.4947**	.1338
Number of Probation/parole revocations				
One or more	.3501		.3181	.2431
Number of prior felony convictions				
One	.2021		.2410	.1260
Two or more	.2752		.3602	.2005
Conviction/juvenile adjudication for				
Burglary, theft, auto theft, or robbery	-.0710		-.0760	-.0921
Worthless checks or forgery	-.3728		-.3818	-.2238
Both categories	-.0723		-.1846	.1013
Percentage of time employed				
40-59%	.1082		-.1435	.0466
Under 40%	.2920		-.0541	.3308
Alcohol usage problems				
Occasional abuse	.0727		-.5680	.1766
Frequent abuse	-.1760		-.8043	-.1006
Other drug usage problems				
Occasional abuse	.3800		.1854	.3923
Frequent abuse	-.1021		-1.2701*	-.1319
Problems with current living situation				
Moderate disorganization or stress	.1238		-.1237	.0625
Major disorganization or stress	.4135		.3923	.3852
Social identification				
Mainly with delinquent individuals	.3646		.2092	.4640
Response to court or imposed convictions				
Moderate compliance problems	.2401		.1013	.2725
Has been unwilling to comply	.2825		.1745	.2107
Use of community resources				
Needed but not available	.7427		.8054	.5940
Utilized but not beneficial	.3305		.2632	.2221
Available but rejected	.4531		.3424	.5511
Needs items				
Academic/vocational skills				
Adequate skills		.1866	.2252	
Low skill level		.2451	.1856	
Minimal skill level		.6918	.7474	
Employment				
Secure employment		.2987	.1965	
Unsatisfactory employment		.6205	.5690	
Unemployed and unemployable		-.2277	-.1920	

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
Financial Management				
No current difficulties		2.2991*	2.1517	
Situational or minor difficulties		2.2816	2.1577	
Severe difficulties		1.6563	1.4591	
Marital/family relationships				
Relatively stable relationships		-.9138	-.6639	
Some disorganization or stress		-.4529	-.1980	
Major disorganization or stress		-.4314	-.4340	
Companions				
No adverse relationships		-.7351	-.9363	
Associations with occasional negative results		-.6245	-1.0676	
Associations almost completely negative		.0436	-.6565	
Emotional stability				
No symptoms of emotional instability		1.2219	1.1595	
Symptoms limit but do not prohibit functioning		1.4196	1.2814	
Symptoms prohibit adequate functioning		.9564	.4608	
Alcohol usage		.0953	.6651	
Occasional abuse		-.1361	.4623	
Frequent abuse				
Other drug usage		.3347	.1875	
Occasional abuse		.5196	1.4651*	
Frequent abuse				
Mental health		.1533	.0541	
Some need for assistance		.1763	.3046	
Deficiencies severely limit functioning				
Physical Health		-.3330	-.2500	
Handicap or illness interferes with functioning		-.3558	-.1044	
Serious handicap or chronic illness				
Sexual behavior		-.7235	-.7848	
Situational or minor problems		-.6437	-.5411	
Chronic or severe problems				
PPOs impression of needs				
Low		-.0958	-.1335	
Medium		.1892	.0187	
Maximum		.4936	.1237	
Prior offense types				
Prior convictions for a violent offense				-.0023
Prior convictions for a drug offense				.3319
Weapon used during commission of current offense				-.0505
Age at intake				-.0373**
Married				-.0528
Living with friends				-.9162*
Probationer (not parolee)				-.5182*
Male client				-.3876
Ethnicity				

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
White client				-.4653
Hispanic client				-.3725
African American client				-.1588
Length of follow up period				.0272***
Number of observations	878	878	878	878
Likelihood ratio	1075.034	1079.163	1039.977	1010.098

*p<.05
**p<.01
***p<.001

Poisson regression results

A Poisson regression is used to model the number of arrests after the client completed probation/parole supervision, using the RNA items from the final re-assessment as predictors. These results are presented in Table 5.8. We tested three global hypotheses: (1) whether the needs portion improves the predictive fit of the model over just the risk portion, (2) whether the risk portion improves the predictive fit of the model over just the needs portion, and (3) whether the inclusion of additional, non-RNA items improves the fit of the model. By comparing the deviance of Models 1 and 3 ($\chi^2 = 92.23$, df =31, $p<0.001$), we found that the needs portion does improve the ability of the model to predict the number of arrests beyond the risk portion. The second hypothesis, that the risk portion predicts number of arrests beyond the predictive ability of just the needs portion, is also supported ($\chi^2 = 139.35$, df = 24, $p<0.001$). The third hypothesis, that the items not currently included in the RNA improve the predictive fit of the model, is also supported ($\chi^2 = 158.66$, df = 12, $p<0.001$). Because the final model is the best predictive model, only Model 4 will be discussed below.

For interpretation of the results, it is important to recognize that the effects reported in the following analyses (for both the poisson and negative binomial) are relative to a reference category. That is, within each RNA item, there will be a regression effect coefficient for each of the categories of that RNA item. The category that is the reference category will have an effect of 0.0000, and the other effects will be relative to that reference category. A significant effect, means that the effect for that category is significantly different from the reference category. A negative effect indicates a lower average number of re-arrests for clients in that category relative to clients in the reference category, and a positive effect indicates a higher average number of re-arrests for clients in that category relative to clients in the reference category.

The first RNA item, *address changes*, does not have a significant effect in predicting the number of re-arrests. This occurs because no categories of the variable are associated with different levels of offending compared to other categories in the variable. This means that knowing the number of address changes does not help to predict the number of re-arrests.

Age at first conviction is an item that likewise seems to have no effect on recidivism. This is

contrary to virtually all the other results we've seen on this or similar items. Clients who first experienced a conviction at age 19 or younger experience, on average, the same number of re-arrests as those first convicted at older ages.

Both of the next two items work as expected. Clients with no *prior probation/parole revocations* will average 16.6% fewer re-arrests, on average, than clients with a prior revocation. Similarly, clients having no *prior felony convictions* will average 28.3% fewer re-arrests than those with "two or more" prior convictions. There is no discernable difference in recidivism for clients with "one" prior conviction compared to those with "two or more" convictions; this would suggest combining these categories.

The item *conviction or juvenile adjudications for* several categories of offenses has no statistically significant effect. Those clients with no conviction or juvenile adjudication have the same number of re-arrests, on average, as clients who have had convictions or juvenile adjudications for burglary, theft, or for passing worthless checks and forgery.

The next RNA item, *percentage of time employed*, does not have a significant effect either. This is not what was seen for the initial RNA assessment data and may mean that effects of employment operate via other variables.

The next two risk items, *alcohol usage problems* and *other drug usage problems* are very good predictors of the level of recidivism of clients, but not at all in the expected direction. Compared to clients with frequent alcohol abuse and serious problems in functioning, clients with no alcohol abuse issues seem to experience 86.6% **more** re-arrests. Clients with occasional abuse issues experience 57.6% more arrests than clients with the most severe alcohol problems. Likewise, clients with the greatest level of other drug abuse experience only 42% to 48% as many re-arrests as those clients with "no interference with functioning" or those clients with "occasional abuse and some disruption of functioning" due to other drugs. This is a striking finding. Perhaps one possible reason is that clients with severe alcohol and drug problems are also affected in terms of engaging in criminal activity for the time period for which we have follow-up arrest data. The clients with moderate or no drug or alcohol problems are able to more immediately engage in criminal behavior leading to arrests. Perhaps a large portion of clients with severe abuse problems continue in treatment programs and receive de-facto supervision akin to that received while under probation/parole supervision. More likely, the result is an artifact of having multiple items in the RNA instrument that assess the degree of drug and alcohol abuse. This suggests that multiple items should be excluded from a revised instrument. If there is need to assess the risk of abuse separately from the need for abuse treatment, then this should be accomplished via a completely independent needs assessment instrument.

The next risk item, *problems with current living situation*, is statistically significant, and in the direction expected. Relative to clients with "major disorganization or stress" in their current situations, those clients with "relatively stable relationships" experience 27.3% fewer re-arrests on average. Clients with "moderate disorganization or stress" experience 35.8% fewer re-arrests.

The final two risk items, *social identification* and *response to court or division imposed conditions* have effects in the expected direction, but they are not statistically significant.

Turning to the items from the needs portion of the RNA instrument, we find a mixture of significant and insignificant findings. The initial item, *use of community resources* has one statistically significant category, but its predictive effect is not as one might expect. There is no discernible difference in the average number of re-arrests between clients who have "not needed or productively utilized" community resources from those that have "needed but not [found them] available" from those who have found community resources "available but rejected" them. That is, clients in all three categories had statistically similar average re-arrest rates. However, clients who have "utilized [community services] but not [found] them beneficial" experience 27.4% fewer arrests on average than those in the other categories.

Academic/vocational skills did not have any statistically significant effect on re-arrest rates. Clients in all four categories of skill levels had similar rates. This result was not true for clients differentiated by *employment*. Clients ranging from those with long-term employment over one year, secure employment, and those with unsatisfactory employment but having job skills did not experience any statistically significant differences in re-arrest rates. However, clients who were unemployed and were "virtually unemployable" experienced re-arrest rates 76.4% higher than other clients.

The next item, *financial management* indicates a clear and strong effect of having a "long standing pattern of self-sufficiency" on re-arrest rates. The other categories, "no current difficulties", "situational or minor difficulties", and "severe difficulties" are not significantly different in client re-arrest rates. But all three categories are strikingly different from the "self-sufficiency" category. Clients with a demonstrated pattern of self-sufficiency experience approximately 85.4% fewer re-arrests, on average, than clients with some degree of financial difficulty.
The next four needs items, *marital/family relationships*, *companions*, *emotional stability*, and *alcohol usage* do not have statistically significant effects on re-arrest rates. The average number of re-arrests is the same for clients in any category of these items. The items may note areas of life for which a client may have need for assistance or programs, but they do not help to predict the number of arrests after probation/parole supervision ends.

The item *other drug usage* does help to predict the number of arrests a client will experience after probation/parole supervision ends. This significant finding, coupled with the opposite findings for the risk item on other drug usage suggests that including both items creates a situation that renders some estimates of effects unreliable. In particular, the contrary results of the risk item are just the sort one would find due to the "double accounting" of drug and alcohol problems. In any event, for the needs item on drug usage, there is no significant difference in re-arrest rates clients with "no interference in functioning" and those with "occasional abuse and some disruption of functioning". Those clients with "frequent abuse, serious disruption, [and] needing treatment" experience more than twice as many (2.3x as many) re-arrests on average as clients in the other categories.

The next needs item, *mental ability* has no significant effect in predicting arrest rates. Clients falling in any category of the item have the same re-arrest rate.

The needs item *health*, pertaining to a client's physical health, does have significant ability to predict re-arrest rates. Compared to a client with "serious handicap or chronic illness", a client in "sound physical health" has 41.6% fewer re-arrests. A client with a "handicap or illness [that] interferes with functioning on [a] regular basis" has 53.1% fewer re-arrests, on average, than those clients with serious handicaps and chronic illnesses.

The final two items from the needs portion of the final re-assessment are not statistically significant. These are *sexual behavior* and *PPO's impression of client's needs*.

The final set of items included in the analysis of Model 4 are the information items collected from the various RNA assessments, but not specifically included in the RNA-based cutoffs for supervision level. The additional information, however, may be important to include in the analysis as control variables (such as race and ethnicity, to account for differential arrest rates by race/ethnic category), or as a potential predictor of recidivism on its own merits. Three questions are possibly useful additions to the RNA assessment instrument, as they are statistically significant in predicting re-arrest rates. These items are *age at intake*, whether a client was *living with friends*, and where the client had a prior conviction for a drug offense. For each year older a client was upon intake, that client will see a reduction in the average number of re-arrests of 2.5 percent (2.5%). This means that a client whose age at intake was 28 will experience 22.4% re-arrests after supervision ends than a client whose age at intake was 18.

As far as clients living with friends is concerned, it seems that the friends are a good influence. Those clients living with friends have 42.7% fewer re-arrests on average than clients with other living arrangements. This result may be partly artifactual due to similar items in the risk or needs portion of the instrument, and the result should be viewed with some caution. Finally, clients with prior drug arrests had 21.1% more arrests after ending probation/parole supervision than did clients with no prior drug arrest.

Table 5.8 - Poisson Regression Results - Final Reassessment

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
Risk items				
Constant	.9800***	-3.0191**	1.6908	-1.9089
Address changes				
0 None	.0088		.0322	.0300
2 One	.0309		.0254	.0344
3 Two or more	.0000		.0000	.0000
Age at first conviction				
0 24 or older	-.1452		-.1375	.1945
1 20-23	-.0225		-.0185	.0663
3 19 or younger	.0000		.0000	.0000
Number of prior probation/parole revocations				
0 None	-.1864*		-.1770*	-.1817**
2 One or more	.0000		.0000	.0000
Number of prior felony convictions				
0 None	-.4224***		-.4417***	-.3323**
1 One	-.1177		-.1005	-.0945
3 Two or more	.0000		.0000	.0000
Conviction or juvenile adjudications for				
0 None	.0545		.1262	.0498
1 Burglary, theft, auto theft or robbery	.1380		.1878	.0995
2 Worthless checks or forgery	-.1884		-.1465	-.2054
3 Both categories	.0000		.0000	.0000
Percentage of time employed				
0 60% or more	-.2441**		-.0635	-.1079
1 40-59%	.1467		.1347	-.0088
2 Under 40%	.0000		.0000	.0000
Alcohol usage problems				
0 No interference with functioning	.2708**		.7677***	.6241**
2 Occasional abuse; some disruption of functioning	.1864		.5046*	.4547*
5 Frequent abuse; serious disruption; needs treatment	.0000		.0000	.0000
Other drug usage problem				
0 No interference with functioning	-.0663		.9650***	.7247**
1 Occasional abuse; some disruption of functioning	.1713		.9651***	.8590***
2 Frequent abuse; serious disruption; needs treatment	.0000		.0000	.0000
Problems with current living situation				
0 Relatively stable relationships	-.3018**		-.3610**	-.3184**
3 Moderate disorganization or stress	-.2857**		-.4385***	-.4439***
5 Major disorganization or stress	.0000		.0000	.0000
Social identification				
0 Mainly w/non-criminally oriented persons	-.0528		.0285	-.1016
3 Mainly w/delinquent persons	.0000		.0000	.0000
Response to court or division imposed conditions				
0 No problems of consequence	-.4018**		-.3108*	-.2405
3 Moderate compliance problems	-.0194		-.0069	.0499
5 Has been unwilling to comply	.0000		.0000	.0000
Needs items				
Use of community resources				

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
0 Not needed or productively utilized	-.2169		-.1360	-.2321
2 Needed but not available	.1557		.4749	.1661
3 Utilized but not beneficial	-.1534		-.1771	-.3204**
4 Available but rejected	.0000		.0000	.0000
Academic/vocational skills				
-1 High school or above		.0000	.0000	.0000
0 Adequate skills: able to handle everyday requirements		.1360	.1905*	.0984
2 Low skill level causing minor adjustment problems		.1323	.1581	-.0286
4 Minimal skill level causing serious adjustment problems		-.1379	-.1135	-.0713
Employment				
-1 Satisfactory employment for one year or more		.0000	.0000	.0000
0 Secure employment: no difficulties reported		.3403	.2141	.2277
3 Unsatisfactory employment/unemployed but has adequate job skills		.6714**	.4602	.4400
6 Unemployed and virtually unemployable		.8659***	.7145*	.5678*
Financial Management				
-1 Long standing pattern of self-sufficiency		.0000	.0000	.0000
0 No current difficulties		1.9310*	1.7476*	1.8650*
3 Situational or minor difficulties		2.0248**	1.8741*	2.0212*
5 Severe difficulties		1.8656*	1.6483*	1.8915*
Marital/family relationships				
-1 Relationships and support exceptionally strong		.0000	.0000	.0000
0 Relatively stable relationships		-.6970*	-.4233	-.4404
3 Some disorganization or stress but potential for improvement		-.5169	-.2534	-.3549
5 Major disorganization or stress		-.4575	-.4074	-.4881
Companions				
-1 Good support and influence		.0000	.0000	.0000
0 No adverse relationships		-1.0155	-1.1400	-1.3846
2 Associations with occasional negative results		-.8550	-1.0729	-1.3060
4 Associations almost completely negative		-.8957	-1.1388	-1.4544
Emotional stability				
-2 Exceptionally well adjusted; accepts responsibility for actions		.0000	.0000	.0000
0 No symptoms of emotional instability		1.5842*	1.3338	1.5737
4 Symptoms limit but do not prohibit adequate functioning		1.5269	1.3008	1.5262
7 Symptoms prohibit adequate functioning		1.4394	1.0242	1.2411
Alcohol usage				
0 No interference with functioning		.1000	-.4805	-.4411
3 Occasional abuse; some disruption of functioning		.0604	-.2755	-.2284
6 Frequent abuse; serious disruption, needs treatment		.0000	.0000	.0000
Other drug usage				
0 No interference with functioning		-.4320***	-1.1205***	-.8341***
3 Occasional abuse, some disruption of functioning		-.1846	-.9225***	-.8337***
5 Frequent abuse, serious disruption, needs treatment		.0000	.0000	.0000
Mental ability				
0 Able to function independently		.3552	.2813	.3946
3 Some need for assistance, potential for adequate adjustment		.4818	.3548	.4326
6 Deficiencies severely limit independent functioning		.0000	.0000	.0000
Health				
0 Sound physical health, seldom ill		-.0315	-.2070	-.5372*
1 Handicap or illness interferes with functioning on regular basis		-.4881*	-.5737*	-.7569**

Independent Variable	Model one (Risk scores only)	Model two (Need scores only)	Model three (Full RNA)	Model four (RNA plus)
2 Serious handicap or chronic illness		.0000	.0000	.0000
Sexual behavior				
0 No apparent dysfunction		.3155	.4017	.2710
3 Real or perceived situational or minor problems		-.1835	-.1240	-.4555
5 Real or perceived chronic or severe problems		.0000	.0000	.0000
PPO's impression of client's needs				
-1 Minimum		.0000	.0000	.0000
0 Low		-.0557	-.0702	-.2338
3 Medium		.0645	-.1264	-.2460
5 Maximum		.3587	-.0411	-.0736
Prior conviction for violent offense				.0812
Prior conviction for drug offense				.1909*
Weapon used during commission of current offense				-.1497
Age at intake				-.0254***
Married				-.1412
Living with friends				-.5566**
Probationer (not parolee)				-.1596
Sex 1				.1968
Sex 2				.0000
White				.2448
Hispanic				.2025
African American				.2324
Length of follow up period				.0209***
Number of Observations	878	878	878	878
Deviance	1697.17	1744.29	1604.94	1446.27
Degrees of Freedom	853	846	822	810

*** p<.001 ** p<.01 * p<.05

Negative binomial regression results

The same series of regressions estimated with the Poisson model is now estimated using the Negative Binomial model. The purpose of this second set of regressions is to account for an excess of clients with no re-arrests, relative to the expected number under the Poisson assumptions. One of the limitations of Poisson regression is that when there are many zeros in the dependent variable (many people without a subsequent arrest), it tends to under predict the number of zeros. In that case, Negative Binomial regression can be more appropriate. Generally, the difference in the results between the two techniques when there are many zeros is fewer statistically significant variables. Indeed, that is the case here as seen below.

The results of the negative binomial regression are presented in Table 5.9 for all four models as in the Poisson analysis. Like the poisson analysis, the final model including all risk and needs items, along with the additional information collected on clients, is the best fitting model. Our discussion of the results, therefore, will focus only on Model 4 in the table.

As discussed in an earlier section of this report, one of the likely occurrences with the negative binomial model, compared to the poisson model, is that fewer statistically significant items will be found. This was emphatically true in the analysis of the initial assessment data, and it is true in the analysis of the final reassessment data. The list of items which are not statistically significant is: *Address change*, *Age*

at first conviction, *number of prior probation/parole revocations*, *number of prior felony convictions*, *conviction or juvenile adjudications for*, *percentage of time employed*, *alcohol usage problems*, *social identification*, *response to court or division imposed conditions*, *academic/vocational skills*, *employment*, *marital/family relationships*, *companions*, *emotional stability*, *alcohol usage*, *mental ability*, *health*, *sexual behavior*, and *PPO's impression of client's needs*. Some of these items were not significant in the poisson analysis as well as in the negative binomial analysis. Five (5) items from the risk and needs reassessment were statistically significant. We will focus on those items.

The risk item, *other drug usage problems*, is broken into three categories. Two of the categories, "no interference with functioning" and "occasional abuse, some serious disruption" both have effects relative to the category "frequent abuse, serious disruption, needs treatment." However, similarly to the results of the poisson analysis, the effect is opposite expectations. Clients with less severe drug problems, according to the current analysis, have an average number of re-arrests that is about two-and-a-half times (2.5 times) the rate of re-arrest for clients with the most severe problems. At this point, we are fairly convinced that this anomalous finding is truly just an artifact of the inclusion of multiple items measuring drug abuse problems.

Another odd result, which differs a little from the results with the poisson model, occurs with the item *problems with current living situation*. Clients in two categories–"relatively stable relationships" and "major disorganization or stress"–do not experience different rates of re-arrest subsequent to ending probation/parole supervision. This result is contrary to the result from the poisson model, where those clients with stable relationships did have lower re-arrest rates. Clients in the third category, "moderate disorganization or stress," have re-arrest rates that are 40% lower than the clients falling into the other categories. While this result is not strange, it is the lack of differentiation of clients with stable living conditions that is the odd result.

The item, *use of community resources* has very similar results in the current analysis as it did in the poisson model analysis. There is one statistically significant category, but its predictive effect is not as one might expect. There is no discernible difference in the average number of re-arrests between clients who have "not needed or productively utilized" community resources from those that have "needed but not [found them] available" from those who have found community resources "available but rejected" them. That is, clients in all three categories had statistically similar average re-arrest rates. However, clients who have "utilized [community services] but not [found] them beneficial" experience 34.4% fewer arrests on average than those in the other categories. There is not immediate explanation for this anomalous result.

Once more, the negative binomial analysis resembles the poisson model results for the item *financial management*. There is a clear and strong effect of having a "long standing pattern of self-sufficiency" on re-arrest rates. The other categories, "no current difficulties", "situational or minor difficulties", and "severe difficulties" are not significantly different in client re-arrest rates. But all three categories are strikingly different from the "self-sufficiency" category. Clients with a demonstrated pattern of self-sufficiency experience approximately 86.6% fewer re-arrests, on average, than clients with some degree of financial difficulty. This is a very strong effect.

The final needs item with statistically significant effects is *other drug usage*. As in the poisson analysis, the results are as expected. For this needs reassessment item, there is no significant difference in re-arrest rates clients with "no interference in functioning" and those with "occasional abuse and some disruption of functioning". Those clients with "frequent abuse, serious disruption, [and] needing treatment" experience more than twice as many (2.7x as many) re-arrests on average as clients in the other categories.

For the negative binomial model, there were two additional questions, not included as part of the actual RNA instrument, that predict rates of re-arrest. The first, *age at intake*, indicates that the older a client is at intake, the less likely they are to be re-arrested. This result captures the "aging out of crime" effect seen in aggregate data on criminality and age. The second item, and a rather interesting one indeed, is whether the client was a *probationer and not a parolee*. Clients that were probationers while under supervision have re-arrest rates 26.1% lower than those for clients that were parolees.

Table 5.9 - Negative Binomial Regression Results - Final Reassessment

Independent Variable	Model 1 Risk	Model 2 Needs	Model three (Entire RNA)	Model four (Entire RNA plus others)
Risk items				
Constant	1.0375**	-3.2966*	-1.8227	-1.3340
Address changes				
0 None	-.0205		-.0037	.0470
2 One	.0343		.0286	.0865
3 Two or more	.0000		.0000	.0000
Age at first conviction				
0 24 or older	-.2557		-.2413	.0765
1 20-23	-.0704		-.0785	-.0042
3 19 or younger	.0000		.0000	-.0000
Number of prior probation/parole revocations				
0 None	-.2801		-.2773	-.2388
2 One or more	.0000		.0000	.0000
Number of prior felony convictions				
0 None	-.3788*		-.3656	-.1662
1 One	-.0919		-.0858	-.0353
3 Two or more	.0000		.0000	.0000
Conviction or juvenile adjudications for				
0 None	.1078		.1650	.1079
1 Burglary, theft, auto theft or robbery	.0890		.1396	.0909
2 Worthless checks or forgery	-.1299		-.1004	-.0745
3 Both categories	.0000		.0000	.0000
Percentage of time employed				
0 60% or more	-.2602		-.0588	-.0907
1 40-59%	.1847		.1164	-.0425
2 Under 40%	.0000		.0000	.0000
Alcohol usage problems				
0 No interference with functioning	.2900		.7670	.7067
2 Occasional abuse; some disruption of functioning	.2321		.5799	.5480
5 Frequent abuse; serious disruption; needs treatment	.0000		.0000	.0000
Other drug usage problem				
0 No interference with functioning	-.0484		1.0251*	.8982*
1 Occasional abuse; some disruption of functioning	.2650		1.0730**	1.0473**
2 Frequent abuse; serious disruption; needs treatment	.0000		.0000	.0000
Problems with current living situation				
0 Relatively stable relationships	-.3487		-.3637	-.3241
3 Moderate disorganization or stress	-.3590		-.4770*	-.5105*
5 Major disorganization or stress	.0000		.0000	.0000
Social identification				
0 Mainly w/non-criminally oriented persons	-.0809		.0495	-.1193
3 Mainly w/delinquent persons	.0000		.0000	.0000
Response to court or division imposed conditions				
0 No problems of consequence	-.3332		-.2747	-.2903
3 Moderate compliance problems	-.0157		-.0159	.0168
5 Has been unwilling to comply	.0000		.0000	.0000
Needs items				
Use of community resources				
0 Not needed or productively utilized	-.2409		-.1969	-.3063

Independent Variable	Model 1 Risk	Model 2 Needs	Model three (Entire RNA)	Model four (Entire RNA plus others)
2 Needed but not available	.6137		.6998	.2704
3 Utilized but not beneficial	-.1442		-.2219	-.4216*
4 Available but rejected	.0000		.0000	.0000
Academic/vocational skills				
-1 High school or above		.0000	.0000	.0000
0 Adequate skills: able to handle everyday requirements		.1640	.1950	.1167
2 Low skill level causing minor adjustment problems		.2619	.1944	.0068
4 Minimal skill level causing serious adjustment problems		.0932	.1950	.2309
Employment				
-1 Satisfactory employment for one year or more		.0000	.0000	.0000
0 Secure employment: no difficulties reported		.4316	.2563	.2429
3 Unsatisfactory employment/unemployed but has adequate job skills		.7540*	.5320	.4901
6 Unemployed and virtually unemployable		.8166	.4758	.3041
Financial Management				
-1 Long standing pattern of self-sufficiency		.0000	.0000	.0000
0 No current difficulties		2.2218*	2.0152	1.9132*
3 Situational or minor difficulties		2.3215*	2.1000*	2.0290*
5 Severe difficulties		2.2315*	1.9438	2.0839*
Marital/family relationships				
-1 Relationships and support exceptionally strong		.0000	.0000	.0000
0 Relatively stable relationships		-.6719	-.3774	-.4112
3 Some disorganization or stress but potential for improvement		-.5104	-.1926	-.3102
5 Major disorganization or stress		-.4907	-.3065	-.5041
Companions				
-1 Good support and influence		.0000	.0000	.0000
0 No adverse relationships		-1.3855	-1.5757	-1.4374
2 Associations with occasional negative results		-1.1857	-1.4974	-1.4176
4 Associations almost completely negative		-1.2769	-1.6609	-1.6076
Emotional stability				
-2 Exceptionally well adjusted; accepts responsibility for actions		.0000	.0000	.0000
0 No symptoms of emotional instability				
4 Symptoms limit but do not prohibit adequate functioning		1.7680	1.6631	4.6364
7 Symptoms prohibit adequate functioning		1.7063	1.5474	1.5360
		1.6395	1.2975	1.2491
Alcohol usage				
0 No interference with functioning		.0950	-.4853	-.5272
3 Occasional abuse; some disruption of functioning		.0407	-.3163	-.2905
6 Frequent abuse; serious disruption, needs treatment		.0000	.0000	.0000
Other drug usage				
0 No interference with functioning		-.4264*	-1.2027**	-.9955*
3 Occasional abuse, some disruption of functioning		-.1656	-.9770	-1.0014**
5 Frequent abuse, serious disruption, needs treatment		.0000	.0000	.0000
Mental ability				
0 Able to function independently		.4116	.3708	.5926
3 Some need for assistance, potential for adequate adjustment		.6482	.5980	.8438
6 Deficiencies severely limit independent functioning		.0000	.0000	.0000
Health				
0 Sound physical health, seldom ill		-.0138	-.1272	-.6545
1 Handicap or illness interferes with functioning on regular basis		-.5363	-.5544	-.7892

Independent Variable	Model 1 Risk	Model 2 Needs	Model three (Entire RNA)	Model four (Entire RNA plus others)
2 Serious handicap or chronic illness		.0000	.0000	.0000
Sexual behavior				
0 No apparent dysfunction		.4572	.3522	.1362
3 Real or perceived situational or minor problems		.1404	.0283	-.5157
5 Real or perceived chronic or severe problems		.0000	.0000	.0000
PPO's impression of client's needs				
-1 Minimum		.0000	.0000	.0000
0 Low		-.2402	-.1854	-.2717
3 Medium		-.1768	-.3034	-.2745
5 Maximum		.1819	-.1187	-.0093
Prior conviction for violent offense				.0151
Prior conviction for drug offense				.2635
Weapon used during commission of current offense				-.1595
Age at intake				-.0292***
Married				-.0998
Living with friends				-.5555
Probationer (not parolee)				-.3027*
Male client				-.2390
White				.1219
Hispanic				.0555
African American				.1770
Length of follow up period				.0236***
Number of Observations	878	878	878	878
Deviance	710.9004	717.0371	702.3528	742.5490
Degrees of Freedom	.8334	.8476	.8544	.9167

*p<.05
**p<.01
***p<.001

Comparison of results

The results presented above indicate that there is some error overall- about 30% of offenders are false positives and 30% are false negatives. This suggests that there should be some changes made to the reassessment. Since only one type of risk, re-arrests, is analyzed and so few items are statistically significant in the multivariate models, a slightly different procedure is used to determine whether to change any items. While statistical significance is taken into account, we weighed patterns more heavily than we did when comparing the results of the initial assessment (with the exception of items which are not significant in the bivariate analyses). We are much more conservative with our recommendations since only one type of criterion is measured.

First, we searched for items which never predicted risk, even in the bivariate. We found that three items, *mental ability*, *health*, and *sexual behavior*, are never statistically significant. This indicates that these items do not predict risk well and should be eliminated from the reassessment.

Next, we searched for items which are almost always significant. We found that *age at first conviction* often predicted risk, and is consistent with expectations. That is, as age decreases, the likelihood and number of re-arrests increases. Further, from the bivariate we can see that all the categories perform as

expected. We suggest, then, that this item be left in the reassessment, as it is currently written.

Several items are significant in the bivariate and at least one of the multivariate models (usually the Poisson regression). Additionally, these items predicted risk as expected. We suggest that these items be included as currently written. These items are: *current living situation* (although we recommend combining the first two categories to contrast with third), *prior probation/parole revocations*, and *number of prior felony convictions.*

Other items are significant in the bivariate, not in the multivariate, and did not always perform as expected. *Social identification* almost always performed as expected except in Model 3 in the Poisson and Negative Binomial regressions. It is unclear why this occurred. We suggest this item remain on the reassessment as it is currently written. *Employment* for the most part performs as expected. However, unsatisfactory employment and unemployed may need to be combined. First, there are very few people who fall into the latter category. Second, in the Logistic regression, the unemployed category has a negative coefficient, indicating that this category does not predict risk well.

We then examined each item individually. First, we looked at *address changes*. We found that in the bivariate analysis, this item predicted risk as expected. Additionally, although not significant, in the logistic regression, both coefficients for one address change and two or more address changes are statistically significant. This indicates that some number of address changes is associated with increased risk as compared to no address changes.

Bivariate analyses for the item *prior adjudications for property offenses* performs as it did in the initial assessment. That is, only the item burglary, theft, auto theft or robbery really appears to predict risk. Of some interest is that the category burglary, theft, etc., has a negative coefficient in the logistic regression analysis. This indicates that people with prior burglary, theft, etc., offenses are less likely to re-offend. This result may have been found because the other two categories are not good predictors of risk. We suggest that if this item is kept, only the category burglary, theft, etc., be kept.

Next, the *percentage of time employed* in the last six months is examined. This item preforms as expected in the bivariate. This item is not significant in the Poisson models, however. This would suggest that the item should possibly be eliminated, but on the basis of the good pattern of prediction in the bivariate, we merely suggest keeping the item as is, and waiting to see if the validation of the revised RNA will point towards dropping the item.

We then examined the items measuring *alcohol usage*. This item predicts risk in the bivariate. In the logistic regression, the second category, frequent abuse, had a negative relationship with risk. The relationship with risk is opposite the expected direction in the Poisson and negative binomial regressions. We attribute this to the inclusion of a near duplicate item from the needs portion of the instrument. We recommend keeping only one of the two near duplicate items.
Other drug usage predicts risk as expected in the bivariate. It should be noted that there are inconsistencies between the risk and needs portion, however. The average number of offenses differs between all pairs in the needs portion, but not in the risk portion. This item predicts as expected in the first two models of the Poisson and negative binomial regression, but not in the logistic regression. The

last category (frequent abuse) has a negative relationship with risk in the logistic regressions. However, since the usual pattern is consistent with expectations, we suggest that this item be left as it is, but that the near duplicate item from the needs portion be eliminated.

The item on *use of community resources* consistently behaved contrary to expectations. In the bivariate analysis, the clients least likely to recidivate are those clients who do not need community resources and those clients who rejected them. The effect of this item in predicting the average number of re-arrests was not significant. Thus, we suggest eliminating this item.

Marital/family relationships performs as expected in the bivariate and is not statistically significant in any of the multivariate regressions. We suggest this item be eliminated.

The item *companions* performed as expected in the bivariate, but often did not perform as expected in the multivariate models. We suggest this item be eliminated.

We then looked at the item measuring *emotional stability*. We found that it predicts risk as expected, but there is no significant difference in the average number of re-arrests in the last three categories. Moreover, the logistic regression models suggest that the last category is not as highly associated with risk as the previous two. The coefficients in all of the models of the Poisson and negative binomial regressions are negative. This item does not appear to predict risk well. We suggest that it be eliminated.

Financial management is significant only in the bivariate, but performs as expected in the multivariate. However, from both the bivariate and logistic regression, it appears that there is little difference between the situational and severe difficulties. Thus, we suggest these categories be combined.

Finally, the *PPOs impression of the client's needs* is statistically significant in the bivariate, and is not significant in the Poisson regression, nor in the negative binomial regression. However, the bivariate analysis suggests that offenders in the first three categories are less likely to be re-arrested and had a similar number of arrests. This suggests that if the item is kept, then these three categories should be combined. But given the lack of significance in the multivariate analysis, we suggest that this item be considered for elimination.

We also suggest that the duplication of the alcohol and drug usage items on the risk portion and the needs portion be eliminated. One reason is that there is some evidence that these items are not coded consistently, leaving us to question whether these items are useful. Second, it makes more sense to only include it on one portion. Further, it may be fruitful to discuss the possibility of combining the risk and needs sections into one measure.

Table 5.10 - Suggested Revisions to Final Reassessment

Reassessment item	Recommended changes
Address changes	Consider altering categories to include no address changes vs. one

	or more address changes
Age at first conviction	No change
Number of prior probation/parole revocations	No change
Number of prior felony convictions	No change
Conviction for property offense	Combine categories to create distinction between those with prior convictions for burglary, theft, auto theft, and robbery vs. those without such prior convictions.
Percentage of time employed	No change (but eliminate duplication)
Alcohol usage problems	No change (but eliminate duplication)
Other drug usage problems	No change (but eliminate duplication)
Problems with current living situation	No change
Social identification	No change
Response to court imposed conditions	No change
Use of community resources	Eliminate
Academic/vocation skills	Combine low skill level and minimal skill level categories
Employment	Eliminate (to avoid duplicating item in risk portion)
Financial management	Combine situational or minor difficulties and severe difficulties categories
Marital/family relationships	Consider elimination.
Companions	Consider elimination.
Emotional stability	Eliminate
Mental health	Eliminate
Physical health	Eliminate
Sexual behavior	Eliminate
PPOs impression of client's needs	Consider elimination.

Table 5.11 - Revised Reassessment

Revised reassessment risk/needs

Revised reassessment risk/needs	
Number of address changes in the last 6 months	None One or more
Age at first conviction	24 or older 20 to 23 19 or younger
Number of probation/parole revocations	None One or more
Number of prior felony convictions	None One Two or more
Percentage of time employed in the last 12 months ..	60% or more 40% to 59% Under 40%
Alcohol usage problems	No interference with functioning Occasional abuse: some disruption of functioning Frequent abuse: serious disruption, needs treatment
Drug usage problems	No interference with functioning Occasional abuse: some disruption of functioning Frequent abuse: serious disruption, needs treatment
Problems with current living situation	Relatively stable relationships Moderate disorganization or stress Major disorganization or stress
Social identification	Mainly with non-criminally oriented people Mainly with delinquent persons
Response to court imposed conditions	No problems of consequence Moderate compliance problems Has been unwilling to comply
Academic/vocational skills	High school or above Adequate skills; able to handle everyday requirements Low or minimal skills causing adjustment problems
Financial management	Long standing pattern of self sufficiency No current difficulties Situational or severe difficulties
Marital/family relationships	Relationships strong/stable Some disorganization or stress Major disorganization or stress

Revised reassessment risk/needs	
PPOs impression of client's needs	Minimum, low or medium Maximum

Section Six - Discussion

There were several goals to this report. First, we presented the results of the validation of the initial RNA with respect to recidivism as measured by subsequent arrests. Second, the validation of the final reassessment with respect to recidivism was detailed. Third, we suggested revisions to be made to both the initial RNA and the final reassessment. In this final section, we discuss the limitations of the present study and how that impacts our results, we discuss how we envision the way the RNA would be used in the future, and what steps need to be taken next.

Limitations of this study

There are at least two limitations to this study. The first is that the recidivism measure only measures official arrests. Thus, this does not measure all subsequent offenses committed. One problem this may cause is that some offenses may be less easily detected than others. For example, someone who drives under the influence of alcohol and/or drugs may do so numerous times and only be caught once or twice, or never. This particularly effects the reassessment since recidivism is the only measure of risk used to validate this portion of the instrument. This is not an unusual limitation for this type of study and there are few methods to rectify this limitation.

The second problem is the validity of the reassessment is based solely on the final reassessment, rather than any of the reassessments occurring after the initial and before the final. It could be that certain items in the reassessment predict performance while on probation and parole, but not recidivism. Thus some items that we have suggested be eliminated may actually predict other risk measures. Only the final reassessment could be considered because the automated database provided by the Probation and Parole Division only included the last recent reassessment. This is consistent with the protocol outlined by Wisconsin. However, we suggest that all of the reassessments be automated. Not only would it be useful for future validation studies, it would also be of value for offender progress over time for those items that are dynamic.

Use of the RNA in the future

We suggested that the risk/needs assessment be combined into one instrument, eliminating most of the needs items – and in particular the near duplicate items. This validation is based on the statistical prediction of **risk**. Although the needs portion may be very useful for supervision planning, the analyses indicate that statistically, most of these items do not predict risk. The very items that do not predict risk, however, may actually be useful for assessing the level of needs of a client. However, we suspect that rarely will a client require high levels of supervision only due to their needs. Such clients are quite likely to turn out to be risky as well.

Another aspect of some of the needs items recommended for elimination, is that the item categories may not be well defined. For example, the difference between unemployed and unemployable may not always be clear cut. Further, the PPO survey indicates that probation officers do not always feel qualified to assess some of these items. For example, whether the client has sexual behavior problems may be difficult to ascertain. It may be more appropriate to ask whether there is any indication that the client has committed a sex offense. We recognize that some items may be substantively important, although they are not statistically significant. Particular items that have substantive importance in determining risk should be included on the RNA. We also believe that it would be prudent to include a second independent instrument for measuring needs. We envision this independently developed assessment instrument would be used for supervision planning. Thus, one instrument would be used to assess an offender's risk and place him/her into a supervision level. After the offender's risk is assessed, the needs portion could be used to help determine the offender's appropriateness for certain programs. For example, if an offender poses an extremely high risk, but has low needs as measured by the second instrument, that offender may be placed in ISP. However, if the offender poses high risk and high needs, then the offender might be more appropriate for Community Corrections. Thus, the risk portion would only be used to determine the level of supervision the client should be placed in. The new needs instrument, which could include items currently on the pre-sentence report such as religiosity or socio-economic problems, would be used specifically for supervision planning and placement.

Additionally, other items not currently on the RNA may need to be included. Such items may include gang involvement, whether a weapon is used in the current offense, or any other item deemed important for predicting risk. It should be kept in mind that some items are predictive of risk, but not needs, and that the needs, although important, do not necessarily predict risk A focus group with PPOs may need to be conducted to specify items that should be included. A comparison of the results from this validation study and the PPO survey may reveal more.

Steps to be taken next

The next step to be taken is a meeting between ISR evaluation staff and PPD staff to discuss the potential revisions to the RNA. Once items to be included have been agreed upon, a validation of these items with the holdout samples needs to be completed. The analyses will indicate which of these new items, old items and old items with revised categories, should remain on the final draft. Once these items are selected, the weights of the categories need to be computed based on the analyses. Third, new cutoff scores to determine the supervision levels will have to be figured. If a needs instrument to be used for supervision planning and placing offenders into special programs is to be constructed, this will have to be completed before implementing the revised RNA. A focus group is recommended to finish this step.

In order to implement the revised RNA, the following steps need to be completed. First, a new training manual will have to be written. Second, a training on how to use the new RNA should be completed. Third, a reliability check will need to be completed by the evaluation staff to ensure that PPOs are all completing the forms as consistently as possible. Finally, the form may be fully implemented. Throughout this process, we may discover that some items need to be refined, thus this will occur as necessary.

Finally, the point at which the instrument is first administered by the PPOs needs to be discussed. We

believe that the appropriate point of initial administration is before the client is assigned to a program. This is crucial for the validity of the instrument, and for the planning and placement form (if this is to be used). It makes no sense to place an offender into a program prior to discovering the risk the offender potentially poses. If an offender is placed into Community Corrections, but measured objectively is really a low risk client, this is a waste of the Division's limited resources. The original Wisconsin protocol mandated that offenders be assessed after being assigned to a PPO. This makes sense when the only program available is either probation or parole. However, since there are now numerous special programs, altering the point at which the instrument is administered is paramount to its utility.

Periodic checks of the validity of the new instrument need to be completed. The instrument could be perfectly valid now, but over time, the instrument could no longer be valid. Essentially, the risk prediction instrument may need to change with the times.

Appendix A. Comparison of analyses

Statistical technique	Means	Poisson	Dummy Poisson
Dependent variable (measure of risk)	Technical violations	Technical violations	Technical violations
Address changes	***	**	** 2 or >only
Time employed	*	* but neg	**<40% & neg
Alcohol usage problems	** freq<occ	**	N/S
Other drug usage problem	***	**	*
Attitude	**dep<ratnl	**	*
Age at first adjudication	***	**	**
Number of prior periods of probation/parole	***	N/S	N/S
Number of prior revocations	***	**	*
Number of prior felony convictions	***	**	* 2 or > only
Conviction or juvenile adjudications for:	***	N/S	* burg only
Conviction or juvenile adjudication for assault in last 5 years	N/S	** 4 only, neg	** 4 only, neg
Academic/vocational skills	***min<low	**	**
Employment	**unemp<unsat	N/S	N/S
Financial Management	N/S	N/S	N/S
Marital/family relationships	N/S	**but neg	**all neg
Companions	***	**	N/S
Emotional stability	N/S	* (only 4)	*in 4; limit and prohib only
Alcohol usage	*** cat 6<3	** but neg	N/S
Other drug usage	***	N/S	N/S
Mental ability	N/S	** but neg	N/S
Health	N/S	N/S	* in 4;int. With function only
Sexual behavior	N/S	N/S	N/S
PPO's impression of client's needs	***	*(3 only)	N/S

* $p < .05$
** $p < .01$
*** $p < .001$
N/S not significant

Statistical technique	Negative binomial	Cross tabs	Logistic
Dependent variable (measure of risk)	Technical violations	Successful completion	Successful completion
Address changes	**	***	*two or >, neg
Time employed	N/S	***	N/S
Alcohol usage problems	N/S	N/S	N/S
Other drug usage problem	* 4 only	***	N/S
Attitude	N/S	***	*rational, neg
Age at first adjudication	N/S	***	***3 only, neg
Number of prior periods of probation/parole	N/S	***	N/S
Number of prior revocations	**	***	* 3 only, neg
Number of prior felony convictions	N/S	***	N/S
Conviction or juvenile adjudications for:	* 3 only	*** worth about =	***cats 1 and 3 neg
Conviction or juvenile adjudication for assault in last 5 years	N/S	N/S	N/S
Academic/vocational skills	* 3 only	***	N/S
Employment	N/S	***	N/S
Financial Management	N/S	***	N/S
Marital/family relationships	N/S	N/S	N/S
Companions	N/S	***	N/S
Emotional stability	N/S	N/S	N/S
Alcohol usage	N/S	** freq less risk	N/S
Other drug usage	N/S	***	N/S
Mental ability	N/S	N/S	N/S
Health	** 3 only; neg	N/S	*4 only, interfere, neg
Sexual behavior	N/S	N/S	N/S
PPO's impression of client's needs	N/S	*** med less risk	N/S

* $\underline{p} < .05$
** $\underline{p} < .01$
*** $\underline{p} < .001$
N/S not significant

Statistical technique	Cross tabs	Logistic (models 1 and 4)	Means	Poisson (Model 4)	Negative binomial (Model 4)
Dependent variable (measure of risk)	Any subsequent arrests	Any subsequent arrests	Number of subsequent arrests	Number of subsequent arrests	Number of subsequent arrests
Address changes	N/S	N/S	***	***	*
Time employed	***	N/S	**	** not in correct dir.	N/S
Alcohol usage problems	***	N/S	N/S	N/S	N/S
Other drug usage problem	***	**not occ. use	***	***	* only 1 category
Attitude	***	*not rationalizes	*	* only 1 category	N/S
Age at first adjudication	***	***m1 only	***	***	N/S
Number of prior periods of probation/parole	***	N/S	***	***	N/S
Number of prior revocations	***	***	***	** only 1 category	*
Number of prior felony convictions	***	N/S	***	* only 1 category	N/S
Conviction or juvenile adjudications for:	*** but not for worthless checks	*not worthless checks or both	***not worthless checks	*	N/S
Conviction or juvenile adjudication for assault in last 5 years	N/S	N/S	N/S	* not in correct dir.	N/S
Academic/vocational skills	***, but -1,0 ≈		***, but -1,0 ≈	* only 1 category	N/S
Employment	***, but -1,0 ≈		***, but -1,0 ≈	N/S	N/S
Financial Management	**, but -1,0 ≈		N/S	* but 3 categ equal	N/S
Marital/family relationships	N/S		N/S	N/S	N/S
Companions	***, but -1,0 ≈		***, but -1,0 ≈	N/S	N/S
Emotional stability	N/S		N/S	N/S	N/S
Alcohol usage	***		N/S	N/S	N/S
Other drug usage	***		***	N/S	N/S
Mental ability	N/S		N/S	N/S	N/S
Health	* in 3;N/S & neg in 4		* but opposite	*** not correct dir	N/S
Sexual behavior	N/S		N/S	*** not correct dir	N/S
PPO's impression of client's needs	*** but medium needs has fewer arrests		**, but -1,0 ≈	N/S	N/S

* $p < .05$ ** $p < .01$ *** $p < .001$ N/S = not significant