Youth on Juvenile Probation in Montana
Community Service and Recidivism

Calendar Year 2011

A Report Prepared for the
Montana Supreme Court
Office of the Court Administrator

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EXECUTIVE SUMMARY

During calendar year 2011, there were 4850 unduplicated youth referred to Youth Court's juvenile probation. Of these, 1773, (36%) received an intake with community service assigned. The Office of the Court Administrator (OCA) worked with researchers at the University of Montana to answer a series of key questions concerning community service and recidivism. Summary answers to these questions are addressed first in this executive summary and then more thoroughly in the body of the report.

Judicial districts were grouped according to four different models of Community Service (CS) based on the primary model used in the district: Nonprofit, Single Agency, Independent Contractor, or Supervised by Probation. Additional variables for all youth were compiled into a statistical data set and key questions addressed.

- Does the number of hours ordered, percentage of hours completed, and percentage of hours waived differ significantly by CS model?

There are significant differences. In districts using the Nonprofit model there were less hours ordered than in the other three models. Also, the Single Agency and Independent Contractor models generally ordered more hours. As the study progressed, the actual number of hours ordered proved much less important than whether or not the youth completed them or had some/all waived.

A higher percent of youth completed their hours in both the Independent Contractor and Supervised by Probation models and this is good; completing all ordered hours is associated with lower recidivism (as discussed further below). Waiving hours however proved problematic.

The practice of ordering CS hours and later waiving all or part of them was examined extensively and found to vary by CS model. Overall, youth with waived hours had significantly more ordered to begin with (27.5) than those who had none waived (24.6) indicating that perhaps more hours were ordered than could reasonably be completed (7.4% of all youth had more than 50 hours ordered). The Nonprofit model districts waive a comparatively higher than average percent of hours while the Independent Contractor and Supervised by Probation models waive significantly less.

When comparing models, and excluding the youth with waived hours so that only those who completed or did not complete were examined, we found the Single Agency model has less youth complete all hours. The Independent Contractor model completes a higher percent of youth than the other three models. Moreover, the Nonprofit model waives CS hours for more youth and waives a higher percentage of them than the other models. Youth in the Independent Contractor model are significantly less likely to have hours waived, and when they do, will have less of them waived than youth in the other models. They are also more likely (when none are waived) to complete all their hours. Waiving hours has implications for recidivism.

- Which youth were at higher risk than others to recidivate?

Youth at highest risk to recidivate were those with more offenses on the first intake, those committing felony offenses, those completing less of their CS hours as ordered and youth who were getting hours waived. These results arose from comparing individual variables with the outcome of recidivism and changed only slightly when many factors were considered simultaneously. The implication is that probation officers should consider youth with felony charges; with many charges; not completing CS as ordered; and/or having ordered hours waived as being at highest risk for recidivism and use this knowledge to increase intervention and supervision efforts.

- Specifically, how do recidivists and non-recidivists compare on percent of hours completed or having hours waived? On number of hours ordered?

Recidivists completed significantly less CS hours than non-recidivists. In essence, youth who complete their hours as ordered without having any waived are less likely to recidivate. Those with any hours waived recidivated more than those with no hours waived. Hours ordered did not differ significantly between recidivists and non-recidivists.

- Are youth in some CS models at higher risk for recidivism than others?

The Single Agency model has a significantly higher percent of youth recidivating than others, while the Nonprofit model has a significantly lower percent recidivating. Both the Independent Contractor and Supervised by Probation models did not differ significantly from the other models. In more complex analysis of what drove recidivism, the Nonprofit model proved to be a robust and reliable predictor of lower recidivism despite its high risk practice of waiving hours. Should the districts using the Nonprofit model waive less hours in the future this could prove to be even more of a standout model of CS with regards to having the lowest recidivation rate for youth on probation with community service.

- What role does number of offenses at intake, crime type and crime category play in recidivism?

The number of offenses at intake and the crime type (and category) has an impact on recidivism: the higher the number of offenses on intake, the more likely the youth will recidivate. Youth committing felony offenses had a 54.0% recidivism rate compared to 41.7% for misdemeanors and 46.3% for status offenders. Those with a dangerous drugs charge listed first on their intake ticket have a significantly lower recidivism rate than others and those initially charged with a crime against public order have a significantly higher recidivism rate. While having a felony continued to be a robust predictor of recidivism, the categories of dangerous drugs and crime against public order did not. Felony offenders had significantly more hours of community service

ordered to begin with (42.8 hours), and less waived, indicating that ordering more hours for these offenders and waiving less of them did not have the desired effect of achieving a recidivism rate on par with the other crime types. In essence, youth who committed more serious crimes and more of them to begin with had the higher recidivism rate in the long run, regardless of CS.

- Which factors, examined together, indicate a higher risk for recidivism for youth with CS ordered?

Using statistical models where many of the factors addressed in the questions above are considered together highlights the complexity of what goes into predicting risk for recidivism. The predictive power of several variables proved robust. The biggest effect comes from the number of offenses the youth has on intake: the more offenses to start with, the higher the risk of recidivism - regardless of CS model, gender, crime type or category etc., Youth completing CS hours are substantially less likely to recidivate regardless of all other factors. Also, the odds of a youth recidivating under the Nonprofit model are significantly lower, despite that model's problem with waiving hours. While waiving a youth's hours is itself associated with increased likelihood of recidivism, the Nonprofit model overcomes this and should be considered the practice promising lowest recidivism rates.

- What is the optimal number of hours to order for each type and category of offense in order to lower the likelihood of recidivism?

Extensive analysis was run to determine if a specific number of CS hours ordered for a specific crime type lowered the likelihood of recidivism; there were no statistically significant findings to predict an optimal number of hours to order. The more important predictor, across crime types and categories was simply ordering the number of CS hours that could reasonably be completed and then insuring completion.

The results of this study indicate that young offenders entering Youth Court's juvenile probation system who have more charges, more serious charges and then fail to comply with CS as ordered should be targeted with more aggressive supervision and interventions. The practice of waiving hours (for a variety of reasons) should be examined by each district. Referral to a Nonprofit agency model of CS works best for most youth.

The data used for this study remains available for further analysis should other more specific questions arise.

INTRODUCTION

This study used quantitative research and secondary data analysis methods to statistically examine electronic records extracted from the Juvenile Court Assessment and Tracking System (JCATS) on January 1, 2013. Youth in the study entered the system in calendar year 2011. In order to reach the conclusions presented in the executive summary above, several data analysis and statistical methods were employed. Initially, simple frequencies were used to examine the variables, and preliminary correlations and cross-tabulations explored potential significant relationships between both individual and grouped variables. Please see Appendix A for information concerning research methodology and statistics used. Throughout the body of the report, the term 'significant' is reserved to denote a statistically supported conclusion – one that would not have been arrived at by chance.

Age and Gender

The average age of juvenile offenders in this study is 15.1. Gender is split with boys comprising 64.2% and girls 35.8%. There are no significant differences between boys and girls in the study with regards to age, average number of offenses reported on the intake, being placed on formal or informal probation, CS hours ordered, waived or completed, or the number of times those who recidivated did so. This is a fairly gender-homogeneous population.

There are small but significant gender differences with regards to crime type and crime category. See table 1. Males have significantly more status type offenses and less misdemeanor offenses listed as the first charge on the first CS intake ticket. There are no gender differences in regard to crimes against property, dangerous drugs, against public order, against person, against public administration or other crimes.

Table 1: Gender by crime type and crime category

Type	Male	Female
Status	23.9*	16.9
Misdemeanor	68.5*	73.3
Felony	7.6	9.8
Category		
Against Property	37.1	39.6
Status	23.7*	16.8
Dangerous Drugs	17.5	18.4
Against Public Order	9.0	11.1
Against Person	9.2	9.7
Against Public Admin.	3.4	4.0
Other	0.3	0.5

*Indicates a statistically significant difference between genders

MODELS OF COMMUNITY SERVICE

Each district primarily uses one model of CS monitoring; some districts use more than one on a case by case basis, but districts were grouped according to their primary model as identified by the Bureau Chief Bob Peake. The four models and the districts using them are as follows:

Not For Profit, not paid by OCA (Nonprofit). The Nonprofit model refers youth to a nonprofit agency that is primarily responsible for overseeing

their community service activities and then reports back to probation. Districts using this model are: 2, 3, 5, 6, 7, 11, 12, 13, 16, 17, 18, 19, and 20. Altogether this model includes 1108 youth, or (62.5%) of those in the study.

Referral to a Single Agency/entity not paid by OCA (Single Agency)
The Single Agency model refers youth to a single agency in the community, (*not* a nonprofit agency) which is primarily responsible for overseeing their community service activities and then reports back to probation. Districts using this model are: 1,4,8,9, and 22. Altogether this model includes 437 youth, or (24.6%) of those in the study.

Paid Independent Contractor (Independent Contractor)
The Independent Contractor model refers youth to an independent agency in the community, contracted with and paid by OCA which is primarily responsible for overseeing their community service activities and then reports back to probation. Districts using this model are: 14,15, and 21. Altogether this model includes 200 youth, or (11.3%) of those in the study.

Supervised by Probation Staff (Supervised by Probation)
The Supervised by Probation model has probation staff supervise youth. The only district using this model is district 10. Altogether this model includes only 28 youth, or (1.6%) of those in the study. The small number of cases in this model made it difficult to use for statistical comparison purposes.

CS model is the primary variable under study. Each model was coded in the data set and repeatedly compared to a group consisting of youth in the other three CS models. The general approach to answering the study questions involves comparisons across CS models. The most common method was to compare the average occurrence of a variable, for example number of CS hours ordered per youth.

CS Hours Ordered, Completed, Waived

Examination of Community Service started with looking at number of hours ordered to see if it varies by crime type. Felony offenders stand out right away as having significantly more charges against them at intake and more CS hours ordered - nearly twice as many hours as status offenders. Many more felony offenders (28.7%) have over 50 hours ordered. Despite this, they have a lower percent of CS hours waived. The impact of waived hours is treated separately later in the report. It is likely that Felony offenders had more hours ordered as part of an effort to hold them more accountable.

Table 2 Hours Ordered, Percent Completed, Percent Waived by Crime Type

Crime Type	Average number of charges on intake	Average number of hours ordered	Percent of cases with >50 hours ordered	Percent of CS hours waived
Status	1.12 (n 379) *	21.58 (n 379)	3.7%	13.6%
Misdemeanor	1.44 (n 1244) *	23.96 (n 1244)	5.9%	12.9%
Felony	2.27 (n 149) *	42.82 (n 149) *	28.7%*	7.1%*

*Significantly different than other crime types; n = number of cases

The average number of hours ordered, the percentage of hours completed and the percentage of hours waived was examined to see if it varied significantly by CS model.

The overall average number of CS hours ordered for youth in this study was 25.03 and ranged from 2 to 229; the most frequently ordered number of hours was 20 (31% of the sample). There were predictable clusters at 10,16, 20, 30, and 40 hours. The 16 appears out of place but makes more sense when looked at as two 8 hour work days.

The average number of CS hours completed was 19.78 and ranged from 0 to 217, though the most frequently occurring number was 20 hours (31.9% of the sample). For 16.4% of the youth, zero hours were completed. The same clustering pattern was found at 10,16, 20, 30, and 40 hours. When youth were ordered less than 50 hours, 78.9% of them completed those hours; when they are ordered over 50 hours only 60.3% will complete them. Ordering youth more than 50 hours means they are significantly less likely to ever complete them; this is problematic as non-completion is a predictor of recidivism.

Ordering youth more than 50 hours means they are significantly less likely to ever complete them…

Overall, 76.8% of youth in the study completed all their assigned hours, 14.9% had some or all waived and 8.3% did not complete as ordered. Looking at all assigned hours cumulatively, instead of youth reveals that of all hours ordered statewide for all youth in this time period, 81.4% percent were completed, 12.5% were waived and 6.1% were not completed by the date ordered.

Table 3: Hours ordered, percent completed by CS model

Model and number of cases	Average Number of CS hours ordered	Average Percent of CS ordered hours completed by CS model
Nonprofit (1108)	23.27 (27.97)*	.80 (82.0)
Single Agency (436)	27.67 (24.17)*	.78 (81.0)
Independent Contractor (200)	29.01 (24.53)*	.89 (79.3)*
Supervised by Probation (28)	25.25 (25.03)	.96 (.80)*
Average across all four Models	25.03	.81

* Significantly different than comparison models
(Mean and percent for comparison group consisting of other 3 models is in parentheses)

When comparing the averages of different variables across CS models, the average of the 3 comparison models will change each time. For example, when looking at the Nonprofit model, it is compared to the average of Single Agency, Independent Contractor and Supervised by Probation collectively. When looking at the Single Agency model it is compared to the average for Nonprofit, Independent Contractor and Supervised by Probation collectively, etc. In Table 3, the mean and percent for comparison groups are in parenthesis.

The average number of CS hours ordered was examined for each CS model to see if it differed significantly in relation to the other three; see table 3. In districts using the Nonprofit model there were significantly less hours ordered than in the other three.

Those in both the Single Agency and Independent Contractor models had significantly more hours ordered relative to the comparison models.

The total number of hours completed were summed and divided by the total number of hours ordered to calculate percent complete. This was then compared across models and is also displayed in table 3. On average, 81% of all CS hours ordered for all districts and CS models were completed. A significantly higher percent of youth completed their ordered hours in both the Independent Contractor and Supervised by Probation models.

Waiving CS Hours

In some cases, CS hours ordered are later waived for a variety of reasons. At the time of the study these included: youth location unknown; youth moved out of state; youth deceased; youth turned 18; hours (all or some) waived by judge; transfer to adult probation; or a '208' transfer of supervisory responsibility to district court. For analysis, the data was divided into youth with any waived hours vs. youth without any waived hours. There were 264 youth (14.9% of the study) who had some or all CS hours waived. Of those, 189 (71%) had all CS hours waived. Exploratory analysis of youth with waived hours indicated they had a significantly higher number ordered to begin with (27.5) than youth who had none waived (24.6).

This was broken down further by CS model for comparison and the results are presented in table 4.

The first column was constructed from a cross-tabulation of 'hours waived / not waived' with 'CS model' and shows that a significantly higher percent of youth in the Nonprofit model (18.0%) had their CS waived than expected by the test (chi-square is explained more thoroughly in Appendix A). The Single Agency and Independent Contractor models were lower than statistically expected. The small number of Supervised by Probation cases invalidated the statistical test, though on the face of it, the 1 case with waived hours (3.6%) was visibly less than the 14.9% of all cases for the total sample.

Table 4: Hours waived across models

	Percent of all youth with any hours waived	Average Percent of total hours ordered that were waived	Percent of youth, with none waived, completing all hours
Nonprofit	18.0*	14.6** (8.9)	91.3 (89.5)
Single Agency	11.2*	10.7 (13.10)	86.0* (92.1)
Independent Contractor	7.0*	5.9** (13.3)	94.6* (90.0)
Supervised by Probation	3.6 (1)	3.5** (12.6)	(1)
Average across Models	14.9	12.5	90.6

*significantly different from expected using chi-square statistical rules
**significantly different from comparison models average (in parenthesis)
(1) indicates sample size too small for valid comparison

The second column looks at the average percentage of all hours ordered for all youth that were waived and breaks it down by model. Each model was compared to the other three and the

comparison averages are, again, in parenthesis. Results indicate that the Nonprofit model districts waive a higher than average percent of hours (14.6% compared to 8.9% for the other three). Both the Independent Contractor and Supervised by Probation model districts waive significantly less than their comparison groups.

The third column looks only at youth who had no hours waived and presents the completion rates for each model with a comparison rate of the other three models in parenthesis. This shows that the Nonprofit model is no different than average; that the Single Agency model has less youth complete all hours, and the Independent Contractor model completes a significantly higher percent of youth than the other three.

Taken together the results of this table indicate that the Nonprofit model waives the ordered CS hours for more youth and waives a higher percentage of them than the other models which waive both less youth and less hours overall. Youth in the Independent Contractor model are significantly less likely to have hours waived and when they do will have less of them waived than youth in the other models. They are also more likely (when none are waived) to complete all their hours.

It was beyond the scope of this study to conduct district level analysis but for this one variable it may prove useful for the districts grouped in various models to see where they stand in relation to all others with regards to waiving hours. Appendix B is a table ranking districts by percentage of youth with hours waived.

"Youth in the Independent Contractor model are significantly less likely to have hours waived and when they do will have less of them waived than youth in the other models. They are also more likely (when none are waived) to complete all their hours"

Finally, the 14.9% of youth with waived hours were compared to those with no waived hours to see if they were at higher risk to receive another intake before January 1, 2013, and it was discovered that they were: 52.1 of those with waived hours recidivated compared to only 42.3% of those with no waived hours. These findings led to a wider exploration of factors associated with recidivism.

RECIDIVISM

Recidivism for this work is defined as a youth in the study with a CS assignment who has a new intake at any time through January 1, 2013. For all youth in the study, 43.9% recidivated and 56.1% did not. The mean number of days between first CS intake and recidivism is 173.71, though half recidivate at exactly 132 days or less.

Recidivism is perhaps the most important outcome variable in the study and raises a series of questions concerning which youth were at higher risk than others to recidivate:

- Are youth in some CS models at higher risk than others to recidivate and why?
- What role does number of offenses at intake, crime type and category play in recidivism?

- How do recidivists and non-recidivists compare on number of hours ordered, percent of hours completed or having hours waived?
- Which factors, examined together, indicate a higher risk for recidivism for youth with CS ordered?
- What is the optimal number of hours to order for each type and category of offenses in order to lower the likelihood of recidivism?

Comparing Models With Regards to Impact on Recidivism

Using only the variables of model type and recidivism, and not taking into consideration yet the impact of type of crime, category of crime, completing CS, waiving hours, etc., the recidivism rate was examined for all models. Table 5 shows that the Single Agency model has a significantly higher percent of youth recidivating than others. Moreover, the Nonprofit model has a significantly lower percent recidivating. Both the Independent Contractor and Supervised by Probation models did not differ significantly from their comparison model groups.

Table 5: Recidivism by CS Model

Community Service Model	Recidivism Rate	Recidivism Rate for Comparison Models
Nonprofit	39.6% (n 439)*	51.0% (n 339)
Single Agency	55.6% (n 243)*	40.0% (n 535)
Independent Contractor	40.0% (n 80)	44.4% (n 698)
Supervised by Probation	57.1% (n 16)	43.7% (n 762)

* Results are significantly different than comparison models; n= number of cases

Table 5 was constructed by combining a series of related analyses. The first column of table 5 shows the percent of youth in each CS model who recidivated; the second column shows the percent of youth in the other three models combined (comparison group) which recidivated. Thus, each individual model is considered with regards to comparison to the other three. The Nonprofit and Independent Contractor models had very similar recidivism rates – just about 40%. Only Nonprofit however was significantly lower than its comparison group.

Single Agency also differed from the three models it was compared to as the recidivism rate was higher at 55.6%. Notice that the comparison group for Single Agency includes the Nonprofit and Independent Contractor models with their relatively low recidivism rates of 39.6% and 40.0% and 519 combined cases.

Finally, despite the obvious disparity between the Supervised by Probation recidivism rate of 57.1% and the comparison model's rate of 43.7%, the difference, taking into account the number of cases involved, does not statistically allow ruling out chance, as the procedure used is very sensitive to number of cases. More cases in the Supervised by Probation model would strengthen the findings.

One other way to look at Table 5 is to consider that the recidivism rate for the comparison groups in the second row is the recidivism rate for all youth *minus* those being supervised in the one CS model. Looked at that way, if we exclude youth being

supervised in the Single Agency model, we have the lowest recidivism rate for the remaining youth, 40%. The practice of having youth supervised by a Single Agency does not itself place youth at risk for recidivism but it is one factor.

Number of Offenses, Crime Type and Category, CS Completion Rate, and Recidivism

The total number of offenses listed on the initial ticket was examined for all cases. It ranged from 1-10 with an average of 1.44. 72.4% of cases had only one offense listed; 19.4 had 2 offenses with the rest having 3 or more. Recidivists had an average of 1.53 offenses, significantly higher than non-recidivists who had 1.37.

Recidivism varied by crime type with felony's having a 54.0% rate compared to 41.7 for misdemeanors and 46.3 for status offenders; the differences were statistically significant. Remember from table 2 that felony offenders had significantly more hours of community service ordered to begin with (42.84 hours), and less waived; ordering more hours for these offenders and waiving less of them did not have the effect of achieving a recidivism rate on par with the other crime categories.

"Recidivism varied by crime type with felony's having a 54.0% rate compared to 41.7 for misdemeanors and 46.3 for status offenders…"

In the data, the first crime listed on the initial intake ticket was reported in one of seven categories: against property, status, dangerous drugs, against public order, against person, against public administration and other.

Table 6: Recidivism by Crime Category

Category of Offense	Number and Percent of Youth n = 1766	Percent Recidivating Compared to comparison group	Percent Completing CS	Percent with any CS hours waived
Against Property	671 (37.8%)	42.5 (44.6)	83.6	14.0
Status	374 (21.1%)	46.3 (43.1)	81.9	16.1
Dangerous Drugs	314 (17.7%)	38.5* (44.9)	81.4	14.0
Against Public Order	172 (9.7%)	51.2* (43.0)	81.9	13.5
Against Person	165 (9.3%)	47.9 (43.4)	72.9*	16.4
Against Public Administration	63 (3.6%)	39.7 (43.9)	78.2	19.0
Other	6 (.03%)	33.3 (43.8)	77.6	(1)
Total	1766 (100)	% of all youth recidivating = 43.9	Mean % completion for all youth = 81.0	% of all cases with any CS waived = 14.9

* Significantly different than all others
1. Insufficient cases for analysis
(Comparison groups in parenthesis)

Table 6 reports number and percent of youth in each category who recidivate, as well as the number and percent who complete CS hours ordered. Those with a 'dangerous drugs' charge listed first on their intake ticket have a significantly lower recidivism rate than all other crime combined for comparison; those initially charged with a crime 'against public order' have a significantly higher recidivism rate than all other crime categories combined for comparison. Though technically these two findings are significant they are relatively weak and did not hold up when examined later in the study in combination with other factors predicting recidivism. With other crime categories there are some numerical differences in the percent recidivating relative to the comparison group but statistically they could be accounted for by chance.

Percent of hours complete and percent of youth with any hours waived were included in table 6 and show that each has relatively little relationship with recidivism when broken out by crime category. With regards to completing CS hours ordered there is remarkably little difference across crime categories; only those with crimes against person exhibit a significantly lower completion rate (72.9%), but the recidivism rate for this category is no different than its comparison group.

In the far right column of table 6, the percent of youth in each crime category who have some or all CS hours waived is compared; there are no significant differences across categories with regards to waived hours. Nonetheless, as reported earlier, 52.1% of youth with waived hours had a new intake and this was significantly higher than the 41.3% recidivism rate of those who completed all hours. Looking at table 6 in light of this finding shows that while having waived hours is associated with recidivism, it is not a factor when looked at by crime category.

"Clearly, when looked at from diverse perspectives, there is a strong and significant association between waiving hours and recidivating."

Table 7: Recidivism and CS Hours

Variables concerning hours	Recidivists	Non-Recidivists
Average Number Hours Ordered	25.8	24.4
Percent of Hours Completed	77.1%*	83.9%
Percent of Youth with all Hours Completed	72.6%*	81.4%
Youth with CS Hours Not Completed	60.5%*	39.5%
Youth with any Waived Hours	17.7%*	12.7%

*Significant

Moreover, recidivists, on average, had significantly more hours waived (15.6 hours) than non-recidivists (10.0 hours). It is not clear when in the process the action of waiving hours took place and the specific reasons for waiving (youth deceased, moved, transferred to adult etc.) were not documented in JCATS for calendar year 2011. In the current iteration of JCATS it is being documented. Looked at yet another way, 17.7 % of all youth who recidivated had some or all hours waived while 12.7 % of youth who did not recidivate had some or all hours waived and this too is a significant difference. Clearly, when looked at from diverse perspectives, there is a strong and significant association between waiving hours and recidivating.

Next, recidivism itself was looked at from different perspectives to continue determining which factors, examined together, indicate a higher risk for recidivism for youth with CS ordered. Starting with the dichotomous variable of 'recidivism / no-recidivism' diverse variables were entered into statistical models for comparison.

"Completing all hours ordered lowers the likelihood that youth will recidivate"

Table 7 presents results concerning recidivism and variables related to hours. With regards to number of hours ordered, there was no significant difference as recidivists were ordered an average of 25.84 hours and non-recidivists 24.40. However, recidivists completed a lower percent of those hours (77.1%) than non-recidivists (83.9%). Despite recidivating, some youth are still completing over seventy five percent of their assigned hours. Looking at the non-recidivist group shows that significantly more of them completed their hours as ordered (not waived or incomplete) than the recidivists. Put another way: completing all hours ordered lowers the likelihood that youth will recidivate**.** A similar outcome is found with youth who failed to complete their hours. 60.5% of recidivists failed to complete compared to only 39.5% of the non-recidivist group. Moreover, recidivists had all or part of their hours waived more often than non-recidivists.

One other finding reiterates the importance of the role completing CS hours plays in recidivism. For all those who complete there is an average of exactly 1.00 recidivating events (this mean includes those with 0 events). Those who have hours waived have 1.61. But those who have either failed to complete all hours *or* have them waived, the incompletes, average 2.23 recidivating events. When those who fail to complete CS get in further trouble, they get in more of it. This was looked at one other way: there is a significant negative correlation between percent of hours complete and number of recidivating events. As hours are complete, the amount of further trouble a youth gets in decreases.

There is a substantial robust relationship between how much trouble a youth was in when they came for that first intake and how much additional trouble they experienced later.

Revisiting the variable concerning the average total number of offenses on the intake, (which is 1.44 for all youth in the study), and comparing recidivists and non-recidivists yields results indicating that recidivists averaged 1.53, significantly higher than the 1.37 for non-recidivists. A variable was constructed which allowed for comparison of youth with 2 or more offenses (n=488) to those who had only one (n=1284). The recidivism rate for those with only one offense was 42.4%; for those with two or more it was a significantly higher 47.7%. And for the 144 youth with three or more offenses on the intake the recidivism rate was significantly higher again at 54.9%. This finding reiterates that there is a substantial robust relationship between how much trouble a youth was in when they came for that first intake and how much additional trouble they experienced later.

Another variable in the study documented, for those who recidivated, how many additional intakes occurred in the timeframe of the study. As reported previously, for 56.1% of the youth this was none, or zero. Another 20% had only one additional intake. After that however, it ranges as high as nineteen. A correlation was run to see if the number of offenses on the first intake was associated with the number of times a youth had an additional intake – how many times they recidivated. While the correlation is very small (r=.052 on a scale of 0-1), it is statistically significant. This modest finding strengthens the conclusion that there is a substantial relationship between how much trouble a youth was in when they came for that first intake and how much further trouble they got in.

Multivariate Associations Between CS Model and Key Recidivism Predictor Variables

A multivariate predictor model can address the question: Which factors, examined together, indicate a higher risk for recidivism for youth with CS ordered? The binary logistic regression model is explained in detail in appendix A. Essentially, several predictor variables are concurrently associated with the outcome of recidivism / no recidivism. The statistical model yields a likelihood ratio (called 'predictive power' in table 8) and a significance level for each variable. If the predictive power is greater than 1 it indicates a higher risk; if it is lower than 1 it indicates a decreased risk. The power of the variable to predict recidivism is only useful if the significance level is less than .05.

Table 8: Initial Multivariate Predictor Model

Variables	Significance (p.<.05)	Predictive Power
Total Offenses on intake	0.002*	1.179
Nonprofit/other	0.059	0.476
Paid Contractor other	0.117	0.522
Single Agency/other	0.903	0.952
CS hours ordered	0.954	1.001
CS hours completed/not completed	0.008*	0.604
CS hours waived/not waived	0.944	1.016
Offense felony	0.813	0.807
Offense misd	0.523	0.570
Offense Category status	0.280	1.130
Offense Category person	0.704	1.403
Offense Category property	0.806	1.242
Offense Category pubadmin	0.841	1.201
Offense Category puborder	0.422	2.043
Offense Category drugs	0.927	1.084

*significant predictors in this model

Good variable choices for the model included those where an association with recidivism was already established through earlier analysis above, such as number of offenses on intake ticket; felony crime/other; having hours waived or not, etc. Additional variables were tested when it was theoretically sensible and appropriate, even when no previous association with recidivism was established such as with number of hours ordered. For example, with number of hours ordered there was no difference between recidivists and non-recidivists, but would an effect emerge when other factors were considered simultaneously?

See table 8. In this initial model, the significant predictors of recidivism were 'total offenses on intake', and 'CS hours completed/not completed'. For every additional offense on the initial intake ticket the youth is 1.17 times more likely to recidivate. With regards to the predictive power of completing CS, it is lower than 1 (.60). Those who complete all hours are significantly less likely to recidivate than those who have CS waived or who fail to complete. Put another way, youth with many offenses on the original ticket are at higher risk for recidivism; youth who complete all CS as ordered are at much lower risk. In this model, none of the other predictors, when considered together, had a significant impact on recidivism.

A more informative final predictor model was assembled through an extensive process of theoretically and statistically informed variable inclusion and removal. This final model included 'total offenses on intake', and 'CS hours completed/not completed' along with three of the 4 CS models (there were too few cases to work with in the Supervised by Probation model). Results are displayed in table 9.

Table 9: Multivariate Predictor Model

Variables	Significance (p.<.05)	Predictive Power
Total Offenses on intake	.00*	1.16
CS hours complete or not	.00*	0.59
Nonprofit / other	.03*	0.43
Independent Contractor / other	.06	0.47
Single Agency / other	.65	0.83

* significant predictors in this model

Total offenses on intake continues to be a powerful predictor as does completing CS hours. Youth supervised in the Nonprofit model are less likely to recidivate. The impact of being supervised in the Independent Contractor model looks good, but just barely fails to meet the significance criteria which indicates that it could be a statistically false result. Removing the crime category variables (notice they are absent in this table) allowed for a closer look at the predictive power (or preventative power) of the various CS models which were left in all trials. This brought the effect of the Nonprofit model to significance, showing youth receiving CS supervision in those districts were at lower risk of getting a new ticket. The Independent Contractor model, while looking promising, did not quite come into focus.

Optimal number of hours ordered to lower recidivism

This section of the report addresses the question: what is the optimal number of hours to order for each type and category of offense in order to lower the likelihood of recidivism? Earlier analysis in this report indicated that hours of CS ordered would not be a good predictor of recidivism because essentially there is no difference in the number of hours ordered between recidivist and non-recidivists (recidivists were ordered an average of 25.84 hours and non-recidivists 24.40).

The more specific question asked here is: Which number of hours ordered results in the least number of youth recidivating? It was explored by type and category of crime. The test used for this allows for seeing the likelihood of recidivating for youth at every

increment of hours ordered. This was done for all youth in the study and then for specific subgroups of youth by crime and category: felony offenders; misdemeanor offenders; and for categories of status, crimes against person, crimes against property etc.

Receiver Operating Characteristic analysis could determine the usefulness of ordering hours as a predictor to correctly classify those with and without recidivism. It is the statistic of choice for determining the optimal number of hours to assign in order to achieve the lowest recidivism rate. The statistic rates the usefulness of ordering hours for each subgroup on a scale of .50 to 1.0. If the predictor variable (hours ordered) is useful the test can then suggest the exact number of hours that are most useful for predicting no recidivism. Less than .60 indicates a level not worth considering; a strong finding would be over .80. Using 'hours ordered' for prediction proved not at all useful for any group of youth when considering first crime type or category from their intake ticket. The initial plan to construct a table showing the maximally effective number of hours proved unfeasible in the absence of any significant results. Hours ordered is not at all predictive but, as the earlier work in the report shows, completing those hours is most important.

It is strongly advisable then that the total number of hours ordered does not exceed what a youth can reasonably complete.

Given the relationship between completing hours and being less likely to recidivate, one finding from page 6 of this study is worth reiterating here: ordering youth more than 50 hours means they are significantly less likely to ever complete them. It is strongly advisable then that the total number of hours ordered does not exceed what a youth can reasonably complete.

CONCLUSION AND RECOMMENDATIONS

The Independent Contractor model has more youth who complete and a higher percent of ordered hours complete than others; Youth in this model also have less hours waived and this is positive, given the relationship between completion, waiving and recidivism. This should be considered a promising program with regards to positive outcomes. The Nonprofit model is most associated with lower recidivism, despite having more waived hours and having just an average rate of youth with all hours complete. If the Nonprofit model districts were to waive hours for less youth and increase the number of youth completing all hours it is likely this would further improve the already strong recidivism results.

OCA should consider exploring why there are such diverse models in place across the state. The practice of referring to a Single Agency for CS supervision (24.6% of this sample) should be explored in terms of recidivism rate. A district level analysis of recidivism could prove useful here as one or two larger districts with higher rates could

… When it becomes clear that any youth is not on schedule to complete all services as ordered, especially those in more or more serious trouble to begin with, increased attention from probation is called for.

be weighting the results for all districts included in the model.

Regardless of CS model, youth who have a higher number of offenses when coming to probation and those with more serious offenses (felony) are less likely to fare as well. When it becomes clear that any youth is not on schedule to complete all services, as ordered, especially those in more or more serious trouble to begin with, increased attention from probation is called for. This may mean having the supervising organization (Not for Profit, Single Agency etc.) provide probation with a 'half-time' report or some other timely update that will essentially flag youth who are likely to fail to complete.

The practice of waiving the ordered hours should be reviewed by each district. It does not appear to be just a matter of assigning too many hours as cross-tabulating youth with >50 hours ordered with those who have some or all waived does not show a significant association. OCA has already taken the step of requiring officers to enter in a more specific reason and the date that the hours are waived and this will be useful information moving forward.

The 1.6% of youth in the study who had their CS supervised by probation received less attention in this study: the small number of cases made it very difficult to discover significant findings. Nonetheless, their inclusion in the study made for a useful addition to comparison groups. In reality, while most districts rely primarily on one predominant model of CS supervision, they are likely supervising many themselves. It is advisable that each supervision model becomes more clearly delineated and reliably implemented as this would result in the best data for comparison purposes moving forward.

APPENDIX A: Methodology

Data Collection

Montana Code Annotated 41-5-215 (2)(k) and 41-5-216 (11) granted the researchers access to any and all OCA records pertaining to juvenile offenders and their therapeutic placement. Data collection methods included gathering existing data from JCATS, an electronic data management system used by the OCA. The research team secured a variety of data extracts in Microsoft Excel© spreadsheets from the OCA Data Compliance Monitor/Trainer. Once this information was compiled, it was reviewed by the researchers prior to being coded into variables and converted from Excel© to Statistical Package for the Social Sciences (SPSS). The OCA suggested specific variables for collection, and the researchers added to these as the work progressed. After collecting, reviewing and coding these variables, any inaccuracies or discrepancies in the SPSS data set were reconciled by the researchers in collaboration with the OCA. The data was subjected to extensive exploratory analysis to ensure that it met the mathematical assumptions necessary for more complex statistical processing.

Statistical Methods

Analysis of data employed several statistical methods. Initially, simple frequencies were used to examine the variables, and preliminary correlations and cross-tabulations explored potential significant relationships between both individual and grouped variables. These are reported in text throughout. For this report, the terms “significant” or “significantly” are used to indicate that statistical testing established (or failed to establish) a relationship or association between variables which, according to the mathematical laws of probability, is not due to mere chance. If the probability of the relationship occurring by chance is less than five percent ($p<.05$) it is considered a non-chance finding. In many cases ($p.<.01$) indicated that the chance of error is less than 1 on a hundred. To prevent the reader from ‘tripping over’ statistical jargon and the technicalities of presenting statistical results reporting was simplified in the writing. The researchers are available to discuss any specific questions concerning how particular results were achieved.

Following initial examination, both univariate and multivariate methods were employed. Univariate statistical methods examine the relationship between two variables. For example, univariate statistics can address the question: Is there an association between having any hours waived and getting a new ticket? In this case, we are examining a simple association between one predictor variable (i.e., any hours waived, yes/no) and one outcome variable (any new ticket, i.e recidivism yes/no). This was completed across a series of variables and is reported either in the text or as table footnotes, though, it was also used as a building block and predecessor to the multivariate models.

The two univariate statistics used in this study were chi-square analysis and t-tests. Chi-square analysis is used when exploring relationships or differences between

categorical variables, that is, variables that capture information within categories, such as recidivism/no recidivism, new ticket/no new ticket, and the presence or absence of a particular crime. T-tests are used to examine differences in the mean (average) of a continuous variable, such as number of hours waived, and number of charges on the original intake ticket. With a t-test, the mean of the continuous variable is compared for two groups of juvenile offenders (i.e., recidivists and non-recidivists) in order to see if there is a significant difference. If there is a difference, then the continuous variable is considered a good candidate for use in a multivariate predictor model. In other words, if there is a significant difference in the number of charges on the original intake ticket between recidivists and non-recidivists (there is), then this is a good potential candidate for predicting recidivism in the more complex, multivariate model.

In exploring differences between recidivists and non-recidivists, several variables were run in a series of t-tests (for continuous level variables) and crosstabs (for nominal/categorical variables), to determine which variables would be strong candidates for inclusion in a multivariate predictor model. Significant differences of $p.<.05$ indicate potential for inclusion.

Some categories of variables needed to be broken down into so-called “dummy variables” to further examine their relationships to other variables using chi-square statistics and cross-tabulations (referred to as crosstabs in the report). This was how we were able to compare individual CS models with all others. This was done for all models (eg. Independent Contractor = 1 all others = 0; single Agency = 1, all others = 0 etc.)

One multivariate statistical method was used to build predictor models for this study: binary logistic regression, which is a form of multiple regression. In multiple regression, there is a single outcome variable, such as recidivism/non-recidivism. Several predictor variables are used simultaneously to determine the likelihood that the outcome variable will occur. The procedure also determines if the relationship between specific predictor variables and the outcome variable is statistically significant or could have occurred by chance. For example, when trying to predict recidivism, the researchers were able to look at several predictor variables together, such as: CS model, crime type and category, along with others, in order to determine if one or more of these variables is predicting the outcome. This allows the researchers to examine the effect of each variable together with the effects of all other variables in the model, that is, to examine them *all things considered*.

APPENDIX B: Waiving CS by district

% of youth with any waived hours	District
35.40%	5
32.30%	12
27.80%	17
25.00%	3
24.30%	13
20.80%	14
18.50%	7
16.00%	8
15.70%	20
13.60%	18
12.90%	19
12.50%	11
11.80%	4
11.20%	16
10.70%	1
5.80%	21
3.60%	10
3.10%	22
1.70%	2
0.00%	6
0.00%	9
0.00%	15
14.9%	Statewide average