



The University of
Montana

**JUVENILES ON PROBATION IN MONTANA:
ASSESSING FACTORS ASSOCIATED WITH THE USE OF
THERAPEUTIC TREATMENT FACILITIES**
Fiscal Year 2008

Timothy B. Conley, Ph.D.
Megan Dunlavey, M.S.W. Candidate
Elisabeth Stoeckel, M.S.W.
Meghan Gallagher, M.S.W.



Montana Supreme Court
Office of the Court Administrator

August 31, 2009

CONTENTS

Executive Summary	2
INTRODUCTION	2
KEY FINDINGS	3
IMPLICATIONS FOR PRACTICE AND POLICY	5
DATA CONSIDERATIONS	7
RECOMMENDATIONS FOR FURTHER STUDY	8
CONCLUSION	8
Appendix 1: Methodology	10
DATA COLLECTION	10
STATISTICAL METHODS	10
Appendix 2: Results	12
DEMOGRAPHIC VARIABLES	12
DIAGNOSTIC VARIABLES FOR RTF AND TGH	13
SERVICE-RELATED VARIABLES	15
OFFENSE-RELATED VARIABLES	15
Appendix 3: Predicting Placement in RTF	18
Appendix 4: Predicting Out-of-State Placement in RTF or TGH	20
Appendix 5: Predicting Days in Placement	24
Appendix 6: Predicting Recidivism	26
Appendix 7: Number and Percentage of Juveniles Placed by District	30
Appendix 8: Diagnostic Criteria for Conduct Disorder	31
References	32

TABLES, FIGURES AND STATISTICAL MODELS

Figure 1: Number of Placements	2
Table 1: Placement of Cases by Facility Type	3
Table 2: Diagnostic Variable	3
Table 3: Recidivism by Facility Type	5
Table 4: Demographic Variables	12
Table 5: Diagnostic Variables for RTF and TGH	13
Table 6: Diagnostic Profile of All Cases	14
Table 7: Service-Related Variables	16
Model 1: Binary Logistic Regression for Predicting Placement in RTF	19
Table 8: In-State vs. Out-of-State Placements by Judicial District	20
Model 2: Binary Logistic Regression for Predicting Out-of-State Placement	21
Table 9: Out-of-State Facilities with Sex Offenders	23
Model 3: Multiple Linear Regression for Predicting Days in Placement	25
Table 10: Number and Percentage of Post-Placement Crimes Committed	26
Model 4: Binary Logistic Regression for Predicting Recidivism	28
Table 11: Number and Percentage of Juveniles Placed by District	30

Executive Summary

INTRODUCTION

This report is the result of a contract between the Montana Supreme Court Office of the Court Administrator (OCA), Youth and District Court Services, and The University of Montana (UM) School of Social Work. UM provided the services of Dr. Tim Conley and his graduate student research assistants, Megan Dunlavey, Elisabeth Stoeckel and Meghan Gallagher to complete research and evaluation pertaining to certain OCA records. Specifically, Dr. Conley and his assistants utilized quantitative research and program evaluation methods to analyze the electronic records of juvenile offenders who were referred to and used residential treatment facilities (RTF), therapeutic group homes (TGH), chemical dependency facilities (CDF) and therapeutic foster homes (TFH), both within and outside of the state of Montana, during the 2008 fiscal year (July 1, 2007 through June 30, 2008).

Ultimately, the researchers sought to establish predictor models regarding youth placed in therapeutic treatment facilities. The primary purpose of this study was to determine what predicts placement in RTF, the highest level of therapeutic care for juvenile offenders with primarily psychological disorders. The researchers also investigated what predicts placement in an out-of-state facility, length of stay and recidivism. Four predictor models were constructed for this study to determine which demographic, diagnostic, service-related and offense-related variables predict these outcomes. All collected variables were explored as predictors for these models and subjected to statistical testing in order to establish a more quantitative basis for understanding patterns of placement in therapeutic treatment facilities among juvenile offenders in Montana. This work was approved by the OCA and UM's Institutional Review Board for the Protection of Human Subjects (UM IRB Proposal 116-08).

This study included 251 juvenile offenders who were placed in therapeutic treatment facilities during the fiscal year 2008. These youth had a total of 367 admissions to facilities, representing 367 "cases" for the purposes of this study. Since a single case in this study was defined as an admission to a facility, a single youth may have constituted more than one case, having been admitted more than once during the fiscal year. Throughout this report, unless otherwise noted, the term "case" refers to an admission rather than an offender. Of the 367 cases in the study, 48.0 percent had only one placement during the fiscal year; 25.0 percent had two placements; 18.0 percent had three placements; and 9.0 percent had four or five placements (Figure 1). Of the juvenile offenders who constituted more than one case in RTF and/or TGH, 26.3 percent had one or more placements in RTF before being placed once or more in TGH and 23.1 percent had one or more placements in TGH before being placed once or more in RTF.

In fiscal year 2008, juvenile offenders with mental health and/or substance dependence issues were placed across 72 different therapeutic treatment facilities. Table 1 lists the facilities that received the majority of placements in this study; each type of facility includes an "other" category which is composed of the remaining facilities. The facilities in the "other" category received only one to three placements each. The percentage of cases within each facility type is also presented. TFH placements represented only eight cases and are not listed in Table 1.

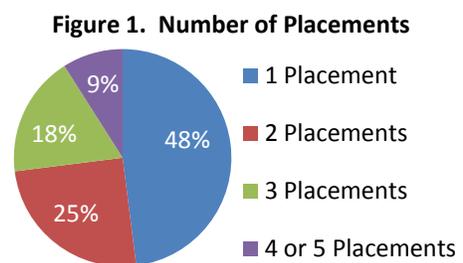


Table 1	Percentage of Cases in Facility	Number of Cases in Facility	Location: In-state or out-of-state
FACILITY NAME BY TYPE			
RTF			
Shodair Children’s Hospital	43.7%	62	In-state
Acadia	26.8%	38	In-state
Other (19 facilities with 1-3 cases)	29.6%	42	Varies
TGH			
Normative Services	18.1%	27	Out-of-state, WY
Alternative Youth Adventures, Journey Boys Group Home	8.1%	12	In-state
YDI Rivers Edge	6.0%	9	In-state
New Day Unit 1	5.4%	8	In-state
Sinopah Group Home	5.4%	8	In-state
A.W.A.R.E. Alpine Group Home	4.0%	6	In-state
Kairos Youth Services, Portage Place Group Home	4.0%	6	In-state
Other (32 facilities with 1-3 cases)	49.0%	73	Varies
CDF			
Teen Recovery Center	41.2%	28	In-state
Rimrock Foundation	22.1%	15	In-state
Other (10 facilities with 1-3 cases)	36.8%	25	Varies

KEY FINDINGS

Juvenile offenders identifying as White were overrepresented in RTF, and American Indians were significantly overrepresented in CDF relative to other programs. There was a slight difference between the average age of cases in RTF (14.1 years) and cases in TGH (14.4 years). Cases in CDF and TFH initially appeared older but this was not a significant difference. Cases with a learning disability represented 35.4 percent of the sample.

With regards to diagnostic variables, bipolar disorder was significantly associated with placement in RTF, and oppositional defiant disorder was significantly associated with placement in TGH. Nearly 30 percent of cases in RTF and TGH had a primary diagnosis of bipolar disorder (Table 2), almost twice as many as the next most frequent diagnosis (oppositional defiant disorder). In a statistical model simultaneously considering several potential predictors of placement in RTF, bipolar disorder emerged as a significant predictor; cases with this disorder were

Table 2	Number of cases with diagnosis	Percent of cases with diagnosis
DIAGNOSTIC VARIABLES		
Bipolar Disorder	83	27.8%
Oppositional Defiant Disorder	47	15.7%
Major Depressive Disorder	41	13.7%
Dysthymic Disorder	29	9.7%
Posttraumatic Stress Disorder	29	9.7%
ADHD	19	6.4%
Other	15	5.0%
Intermittent Explosive Disorder	12	4.0%
Reactive Attachment Disorder	7	2.3%
Substance Use Disorder	6	2.0%
Mood Disorder	6	2.0%
Conduct Disorder	5	1.7%

2.96 times more likely to be placed in RTF than in TGH. A diagnosis of bipolar disorder was also a significant predictor of shorter length of stay relative to all other possible diagnoses.

Across the board, RTF and TGH populations in this study differed very little with regards to most variables. There were no statistically significant differences between the following variables with regards to placement in RTF versus TGH: average total number of prior placements; average number of prior therapeutic placements; average number of prior non-therapeutic placements; average number of offenses prior to placement; average number of intakes prior to placement; average number of services received prior to placement; and average score for the most recent Back On Track (BOT) assessment prior to placement. However, the average length of stay (number of days in placement) differed significantly between RTF (104 days) and TGH (228 days).

The risk of being placed in RTF was 3.33 times higher for juvenile offenders whose most serious offense was partner or family member assault.

Cases placed in CDF had significantly fewer prior therapeutic placements than those placed in either RTF or TGH. Cases placed in CDF also committed significantly more offenses prior to placement, had significantly more intakes prior to placement, and received significantly more services prior to placement than those placed in RTF.

The researchers found that type of offense significantly predicted placement in RTF; the risk of being placed in RTF was 3.33 times higher for juvenile offenders whose most serious offense was partner or family member assault (PFMA) than for those with another most serious offense. Cases where the most serious offense was assault were 2.90 times more likely to be placed in RTF than those with another most serious offense. Those convicted of burglary were 2.89 times more likely to be placed in RTF than those with a different most serious offense.

Juvenile sex offenders were 4.69 times more likely to be placed in an out-of-state facility.

Type of offense also predicted out-of-state placement. The researchers found that the risk of being placed out of state was 4.69 times higher for cases where the most serious offense was sexual in nature than for those with a non-sexual crime. For further discussion of this finding, see Appendix 4. Forty-two total cases reported a conviction for a sex-related crime. The percentage of cases with a sex crime as the most serious offense that were placed in out-of-state facilities was 38.1 percent (16 of the 42 cases). Of those 16 cases placed out of state, 68.8 percent (11 cases) were placed at Normative Services in Wyoming.

With regards to predicting days in placement, the researchers found that sex offense, number of prior therapeutic placements, out-of-state placement and bipolar disorder significantly predicted number of days in placement.

What predicts days in placement?

- * ***Sex offense***
 - * ***Number of prior therapeutic placements***
 - * ***Out-of-state placement***
 - * ***Bipolar disorder diagnosis***
-

For the purposes of this study, recidivism is defined as an offense committed by a juvenile offender after the most recent discharge from a therapeutic treatment facility. Preliminary testing showed statistically significant differences with regards to recidivism. At the time this data was extracted from the Juvenile Court Assessment and Tracking System (JCATS), on February 23, 2009, 335 cases had been discharged from the facilities in which they had been placed. Of these, 53.7 percent had re-offended, or recidivated (Table 3). The recidivism rate for RTF (60.4%) was significantly

higher than that for TGH (43.3%). The highest recidivism rate was for CDF cases in which 65.7 percent of the 67 discharged cases had re-offended. Of primary concern, however, was understanding recidivism for RTF and TGH cases. For these cases, 136 of 268 discharged cases recidivated (50.7%). The average number of days between discharge and re-offense was 104 days with 25 percent of these cases recidivating within one month of discharge (29 days). Fifty percent of cases that recidivated did so at 77 days or less.

Table 3	RTF	TGH	CDF	TFH	Total
RECIDIVISM					
Yes	81 60.4%	55 43.3%	44 65.7%	0 0.0%	180 53.7%
No	53 39.6%	72 56.7%	23 34.3%	7 100.0%	155 46.3%

The recidivism rate for RTF (60.4%) was significantly higher than that for TGH (43.3%).

Number of youth court intakes prior to placement significantly predicted recidivism for all cases in this study. The researchers found that each additional intake increased the likelihood of recidivism 1.24 times. In addition, a case with fewer days in placement had a slight, but significant, increase in risk for recidivism. A more powerful finding,

however, was that cases that were placed in RTF were 2.10 times more likely to recidivate than those placed in TGH. Considered together, these findings indicate that cases with a higher number of intakes, a shorter number of days in placement and placement in RTF were at highest risk to recidivate. Cases whose most serious offense prior to placement was assault were at higher risk to commit an assault when they recidivated. Of the eight cases that recidivated by committing a PFMA, seven had committed the same crime as the most serious offense prior to placement. A diagnosis of oppositional defiant disorder was significantly associated with a post-placement assault offense, and these youth must also be considered at increased risk.

25% of RTF & TGH cases who recidivated did so within one month of discharge.

IMPLICATIONS FOR PRACTICE AND POLICY

Of the youth placed in therapeutic treatment facilities, those at risk for the highest level of care (RTF) are those with a diagnosis of bipolar disorder who commit crimes consistent with conduct disorder, such as assault, aggravated assault or PFMA; they are also more likely to recidivate. The primary reason for referring a youth to RTF is the presence of a mental illness, however, the connection between specific mental health diagnoses and specific criminal behaviors is less clear. Bipolar disorder, oppositional defiant disorder, major depressive disorder and most other diagnoses, as described in the Diagnostic and Statistical Manual of the American Psychological Association, do not list symptoms consistent with the level of aggression or violence evident in the criminal history of this population. Therefore, it is apparent from this study that these juvenile offenders are not only mentally ill, but are also prone to assaultive, sexually-offending, anti-social behaviors more consistent with a diagnosis of conduct disorder (see Appendix 8). It is highly unlikely that only 1.7 percent of any subset of juvenile offenders would be diagnosed with conduct disorder (Shufelt & Cocozza, 2006), yet that is the case in this study. Medicaid reimbursement policy in Montana may be complicit in this, as conduct disorder is not a reimbursable diagnosis. At the very least, it seems that conduct

It is highly unlikely that only 1.7% of any subset of juvenile offenders would be diagnosed with conduct disorder.

disorder should apply as a secondary diagnosis to all youth with this behavioral history. The OCA is advised to consider and further explore reasons why this diagnosis is apparently being avoided.

Key decision-makers must consider the degree to which a youth's assaultive behavior is being interpreted as mental illness. There may be a tendency on the part of mental health professionals to inaccurately attribute behaviors consistent with conduct disorder to a different mental illness. If a significant percentage of the population exhibits symptoms consistent with conduct disorder but are not diagnosed with that disorder, then it is likely they are receiving inappropriate treatment. Evidence-based treatment utilizing best practices for conduct disorder differs substantially from treatment for disorders such as bipolar disorder, depression or post traumatic stress disorder (PTSD). It is conceivable that treatment recidivism (the multiple placements seen in 52 percent of the cases studied) is at least, in part, attributable to the dearth of conduct disorder diagnoses and related treatment.

The possibility that conduct disorder cases are being misdiagnosed as bipolar and sent to the more restrictive level of care (RTF) should be further examined. Inappropriate treatment based on an inappropriate mental health diagnosis may cause recidivism both to another treatment facility and/or to additional criminal behavior. The degree to which conduct disorder and its treatment or non-treatment impact the overall criminal recidivism rate (53.7 percent of the cases in this study) should be explored. RTF cases have a higher criminal recidivism rate (60.4%) than TGH cases (43.3%), and those placed in RTF who did recidivate had shorter lengths of stay. We interpret the high recidivism rate as an indication that RTF treatment is not sufficiently mitigating future conduct-disordered behavior. Examining treatment practices and medication protocols in RTF was beyond the scope of this study; it should be included in future research efforts.

Corroborating a diagnosis of bipolar disorder, the most prevalent diagnosis in this sample, could be accomplished by reviewing the details of the certificates of need for these cases to

“Bipolar” is not a unitary disorder; it is a complex and multifaceted category of related diagnoses with many sub-types.

determine whether specific criteria for the diagnosis are met and, if so, which criteria are most frequent. It would also be useful to determine whether juvenile offenders with a preadmission diagnosis of bipolar disorder are being discharged with the same diagnosis. Additionally, there is a fairly narrow formulary of medications used to treat this mood disorder. To further differentiate true mood disorders from conduct disorders, one could examine the medication history of these cases to see if, in fact, their pharmacotherapy is consistent with their diagnosis.

Resolving complex questions about youth on probation with a mental health diagnosis requires accurate and detailed data. “Bipolar” is not a unitary disorder; it is a complex and multifaceted category of related diagnoses with many sub-types and different features. More diagnostic detail would be beneficial for further study.

Given that a large percentage of this population likely has both conduct disorder and another mental illness, it is concerning that Medicaid and/or other payers do not reimburse for inpatient therapeutic treatment for juvenile offenders with a primary diagnosis of conduct disorder. De-stigmatization of conduct disorder is necessary for effecting positive, systemic change. Diagnosing a juvenile offender with bipolar disorder when their actual diagnosis should be conduct disorder is doing them a disservice, as well. A diagnosis of bipolar disorder provides them a treatment opportunity, though not the appropriate type, potentially victimizing the youth as well as their family and society. Moreover, it is an inefficient use of Medicaid funds to treat a youth with an inappropriate diagnosis of bipolar disorder. It is advised that the OCA consider collaborating

with Medicaid administrators in the state to reform policy and facilitate the most prudent disbursement of treatment funds.

With a violent juvenile offender, the first consideration for the courts is the protection of society. For safety concerns, some of these offenders cannot be allowed to reside in the community, but *they must be placed somewhere*. At present, only four percent of Montana’s 6,244 juvenile offenders are placed in therapeutic treatment facilities (see Appendix 7). Currently, the

Montana Department of Corrections may not incarcerate a severely mentally-ill juvenile offender. Therefore, many of these youth are placed in a therapeutic treatment facility where, without a conduct disorder diagnosis, they likely receive no treatment designed to prevent further criminal behavior. A juvenile offender who is placed in RTF and “acts out” (i.e., exhibits violent, aggressive and/or assaultive behavior) may be discharged due to an inability by that facility to deal with such behavior. However, a diagnosis of a severe mental illness, like bipolar disorder, will prevent their admission to a correctional facility. At this time, there is a need for either a mental health treatment facility or correctional facility that Montana may rely on to properly treat criminal, severely mentally-ill youth.

At this time, there is a need for either a mental health treatment facility or correctional facility that Montana may rely on to properly treat criminal, severely mentally-ill youth.

DATA CONSIDERATIONS

In general, the quality of the information retrieved from the JCATS system was very good, though there is room for improvement. The system is capable of tracking every form of treatment in a juvenile offender’s case history leading up to placement in a therapeutic treatment facility; however, not all information is being tracked consistently, and electronic documentation does not always support the assumption that all juvenile offenders receive treatment at a lower level of care prior to placement in RTF, TGH or TFH. Probation should be required to document pre-intake

For half of the juvenile offenders, there was no record of the number of services received prior to placement in a therapeutic treatment facility.

treatment history, particularly RTF history. To have been admitted to RTF or TGH, juvenile offenders must have been issued a formal certificate of need signed by a licensed professional, mental health case manager and medical doctor. An appropriate prior authorization form must also be completed and approved by First Health Services of Montana, a healthcare management company that assists with utilization management and prior authorization of services as required by the Medicaid program. This certificate is not needed in order for juvenile offenders to enter CDF, though a diagnostic report by a licensed professional is required. In this

study, for half of the sample of juvenile offenders, there was no record of the number of services received prior to placement in a therapeutic treatment facility. It is unlikely that this large group of juvenile offenders received no services, but with no record in JCATS, there was no way to capture this data, rendering the variable inconclusive. This also affected the researchers’ ability to fully understand the case histories leading up to placement in RTF. While this is clearly not indicative of a widespread data collection problem, the OCA is advised to continue insuring that quality, accurate data is recorded in JCATS by individual officers.

JCATS includes a risk assessment system called “Back on Track” (BOT), which may currently be underutilized. BOT measures a youth’s risk and protective factors in ten domains, including

alcohol, drugs and mental health. It is currently unknown if this instrument is valid with rural youth and further validation study should be considered. BOT holds a potential wealth of information that could be of more use to the OCA.

RECOMMENDATIONS FOR FURTHER STUDY

Several areas of further study would enhance the findings of the initial research effort and provide useful information to the OCA. Comparing juvenile offenders placed in therapeutic treatment facilities to the rest of the juvenile offender population in the state would better determine if this is a unique group. This would require extracting data from JCATS on a representative sample of all juvenile offenders in the state against which youth placed in therapeutic treatment facilities could be compared across a series of variables. This would establish whether or not juvenile offenders placed in therapeutic treatment facilities have a different criminal profile than the rest of the population of juvenile offenders. Moreover, it would determine if those placed in therapeutic treatment facilities (4% of all juvenile offenders in the state) are more prone to violent, aggressive and/or assaultive behaviors than those who are not placed in this level of care. Exploring similarities and differences across a wide range of variables would inform policy and practice decisions throughout the OCA juvenile probation system.

Creating a data set representative of all juvenile offenders in the state would allow for further examination of the placement practices of judicial districts. Appendix 7 illustrates both the total number of juvenile offenders in each district and the number and percentage of juvenile offenders in each district placed in therapeutic treatment facilities. Districts that appear to refer a disproportionately high percentage of juvenile offenders to therapeutic treatment facilities should be further compared to districts that appear to refer a disproportionately low percentage of juvenile offenders. For example, what are district 19 (11.0%) and district 6 (1.5%) doing differently with regards to generating referrals for therapeutic placement? It may be that those districts with fewer therapeutic treatment facility referrals are under-identifying mental health issues in their juvenile population, or it may be that their communities are richer in alternative programs such as intensive outpatient treatment. Similarly, explanations should be sought concerning those districts that are referring more juvenile offenders than average for therapeutic placement. The significant differences between districts should be viewed with caution as these findings relied on a single univariate statistic; more complex analysis is needed.

Further study should also explore whether or not juvenile offenders are discharged because they have successfully completed treatment. Reason for discharge was not explicit in the data available to the researchers for the purposes of this study. Other factors may contribute to discharge, such as funding, "aging out" (i.e., turning 18) or disciplinary reasons. Exploring the discharge status of both recidivists and non-recidivists would be useful for informing further predictive models.

CONCLUSION

This report prepared by UM for the OCA clearly demonstrates that the data collection capacity of the OCA is sufficient to use quantitative methods to predict placement in RTF, out-of-state placement, length of stay and recidivism. Useful information was available for demographic, diagnostic, service-related and offense-related variables. Determining the need for placement is infinitely complex; this study relied primarily on quantitative methods and provides answers for select research questions. It certainly does not answer all questions about the process of placing juvenile offenders in therapeutic treatment facilities, and further research efforts are encouraged.

Ensuring continuation of accurate data collection is necessary for the development of fiscally and politically satisfactory answers to key questions of interest. With continued data collection and analysis, it will be possible to further analyze and predict the key outcome of recidivism.

Appendix 1: 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. The following is a list of all variables collected:

Youth ID number	Most serious offense committed
Age at placement	Misdemeanor or Felony
Gender	Services received prior to placement
Race	Services received after placement
Judicial district number	Total number of services
Placement facility	Number of prior therapeutic placements
Placement location (in-state/out-of-state)	Number of prior non-therapeutic placements
Placement type	Total number of prior placements
Placement and discharge dates	Risk level per Back on Track (BOT) assessment tool
Number of youth court intakes prior to placement	Mental health diagnosis
Number of youth court intakes after discharge	Learning disability (yes or no)
Total number of youth court intakes	Length of stay (days)
Number of offenses prior to placement	Discharge placement facility
Number of offenses after placement	Discharge placement type
Total number of offenses	Recidivism (yes or no)
	Recidivism date

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 then 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 present across the different types of facilities. Preliminary correlations and cross-tabulations explored potential significant relationships between both individual and grouped variables. These are reported in tables in Appendix 2. For this report, the term “significant” is used throughout 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.

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 having a diagnosis of bipolar disorder associated with placement in a particular facility? In this case, we are examining a simple association between one predictor variable (i.e., bipolar disorder) and one outcome variable (i.e., facility type). 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 methods.

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 facility type, the presence or absence of a diagnosis, and the presence or absence of a particular crime. T-tests are used to examine differences in the mean of a continuous variable, such as days in placement, age or number of prior intakes, in relation to the grouping variable. With a t-test, the mean of the continuous variable (i.e., days in placement) 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 average number of intakes prior to placement between recidivists and non-recidivists, then conversely, the average number of intakes prior to placement is a good potential candidate for predicting recidivism in the more complex, multivariate model.

Two different multivariate statistical methods were used to build predictor models for this study: binary logistic regression and multiple linear regression. Both are forms of multiple regression. In multiple regression, there is a single outcome variable, such as recidivism/non-recidivism, RTF/TGH placement or number of days in placement. Several predictor variables are used simultaneously to determine the likelihood that the outcome variable will occur (binary) or the degree to which it is correlating with individual predictors (linear). The procedure also determines if the relationship between specific predictor variables and the outcome variable is statistically significant or could have occurred by chance. If the probability of the relationship occurring by chance is less than five percent ($p < .05$) it is considered a non-chance finding. For example, if we are trying to predict recidivism, we may look at several predictor variables together, such as diagnosis, most serious offense committed and number of intakes prior to placement, 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*. The four multivariate predictor models in this study each use a form of regression; each model is explained further as it is used to analyze the data.

Appendix 2: Results

DEMOGRAPHIC VARIABLES

Table 4 provides thorough descriptive information for all cases with regards to demographic variables; footnotes explain significant findings. Exploring relationships between demographic variables and facility type was the first step in determining variables for inclusion in more sophisticated predictor models.

Table 4	RTF N=142 (38.7%)	TGH N=149 (40.6%)	CDF N=68 (18.5%)	TFH N=8 (2.2%)	Total N=367 (100.0%)
DEMOGRAPHIC VARIABLES					
Race¹					
White	83.1%	72.5%	50.0%	87.5%	72.8%
Am. Indian	12.7%	20.8%	44.1%	12.5%	21.8%
African Am.	1.4%	1.3%	2.9%	0.0%	1.6%
Pacific Is.	0.0%	2.7%	0.0%	0.0%	1.1%
Hispanic	0.7%	2.0%	2.9%	0.0%	1.6%
Other	2.1%	0.7%	0.0%	0.0%	1.1%
Mean Age²	14.1	14.4	15.5	15.5	14.5
Gender					
Female	28.2%	37.3%	36.8%	87.5%	34.6%
Male	71.8%	62.7%	63.2%	12.5%	65.4%
Learning Disability	48.5%	44.6%	6.9%	0.0%	35.4%

¹ Whites were significantly overrepresented in RTF and American Indians were significantly overrepresented in CDF ($p < .00$).

² There was a statistically significant difference ($p < .05$) between the mean age of cases in RTF (14.1 years) and cases in TGH (14.4 years). Cases in CDF and TFH appear older but this could be random variation.

The average age at placement for all cases in all facilities was 14.5 years. Of all the cases, 3.6 percent were 7-10 years old; 18.7 percent were 11-13 years old; 20.6 percent were 14 years old; 30.9 percent were 15 years old, 20.3 percent were 16 years old; and 5.9 percent were 17 or 18 years old. The overall distribution of gender was 65.4 percent male and 34.6 percent female. For RTF, TGH and CDF, the gender distribution percentages were similar to the overall sample with no significant difference between facilities. The distribution of gender for TFH (12.5% male, 87.5% female) was substantially different from the overall distribution, with an overrepresentation of females, but due to the small sample size of eight cases this difference could not be subjected to significance testing.

A series of cross-tabulations were run and subjected to testing using the chi-square statistic to determine if there was any significant association between the categorical demographic variables and placement in RTF or TGH. There were no significant associations for gender or learning disability ($p > .05$). Cases identifying as White were more likely to be admitted to RTF, and American

Indians were more likely to be admitted to CDF. A t-test was run comparing age at placement in RTF versus TGH. As Table 4 shows, TGH cases were slightly older than those in RTF. While there were no significant associations between facility type and age or gender, these variables held substantial conceptual and common sense value and were therefore still considered for inclusion in multivariate predictor models later in the study.

DIAGNOSTIC VARIABLES FOR RTF AND TGH

Table 5 provides thorough descriptive information for RTF and TGH cases with regards to diagnostic variables; the diagnoses listed represent the primary mental health diagnosis for each case. Cases may have more than one diagnosis, but it is the primary diagnosis that qualified a case for placement in a therapeutic treatment facility. Footnotes explain significant findings.

Table 5	RTF N=142 (47.5%)	TGH N=157¹ (52.5%)	Total N=299* (100.0%)	Total Percentage (100.0%)
DIAGNOSTIC VARIABLES				
Bipolar Disorder	61.4% ²	38.6%	83	27.8%
Oppositional Defiant Disorder	31.9%	68.1% ³	47	15.7%
Major Depressive Disorder	48.8%	51.2%	41	13.7%
Dysthymic Disorder	37.9%	62.1%	29	9.7%
Posttraumatic Stress Disorder	31.0%	69.0%	29	9.7%
Attention Deficit/ Hyperactivity Disorder	52.6%	47.4%	19	6.4%
Other	53.3%	46.7%	15	5.0%
Intermittent Explosive Disorder	66.7%	33.3%	12	4.0%
Reactive Attachment Disorder	28.6%	71.4%	7	2.3%
Substance Use Disorder	33.3%	66.7%	6	2.0%
Mood Disorder	66.7%	33.3%	6	2.0%
Conduct Disorder	40.0%	60.0%	5	1.7%

¹ For analysis of diagnostic variables, TFH cases were included with TGH cases for a total of 157 cases. Due to the small sample size of eight cases, it was statistically inappropriate to analyze TFH cases separately.

² Bipolar disorder was significantly associated with placement in RTF ($p < .01$).

³ Oppositional defiant disorder was significantly associated with placement in TGH ($p < .05$).

* Table 6 provides a diagnostic profile for all cases in the study, including CDF.

Table 6	Number of Cases Reporting Diagnosis (N=367)	Percentage of Cases Reporting Diagnosis
Diagnosis		
Bipolar Disorder	86	23.4%
Oppositional Defiant Disorder	49	13.4%
Substance Dependence Disorder	43	11.7%
Major Depressive Disorder	42	11.4%
Dysthymic Disorder	29	7.9%
Posttraumatic Stress Disorder	29	7.9%
Substance Abuse	22	6.0%
Attention Deficit/Hyperactivity Disorder	19	5.2%
Intermittent Explosive Disorder	12	3.3%
Reactive Attachment Disorder	7	1.9%
Conduct Disorder	6	1.6%
Mood Disorder	6	1.6%
Psychotic Disorder	4	1.1%
Asperger's Disorder	3	0.8%
Sexual Disorder (Paraphilias)	3	0.8%
Depression NOS	2	0.5%
Anxiety Disorder	1	0.3%
Disruptive Behavior Disorder NOS	1	0.3%
Personality Disorder	1	0.3%
Pervasive Developmental Disorder NOS	1	0.3%
Schizoaffective Disorder	1	0.3%

With regards to CDF, 86.7 percent of cases (N=68) had a primary diagnosis of either substance dependence (58.8%) or substance abuse (27.9%); 4.4 percent had a diagnosis of bipolar disorder, 2.9 percent had a diagnosis of oppositional defiant disorder, 1.5 percent had a diagnosis of major depressive disorder, 1.5 percent had a diagnosis of conduct disorder and 2.9 percent had a diagnosis of "other." Because the majority of these cases were substance use disorders, they were excluded from the analysis of diagnostic variables.

All mental health diagnoses were cross-tabulated with placement at either RTF or TGH; a chi-square statistic determined that there was an overall significant association ($p < .05$) between diagnoses as a whole and placement type. The data was further examined to determine which specific diagnoses were predicting placements. For example, were juvenile offenders with a diagnosis of bipolar disorder more likely to be placed in RTF or TGH? Answering this and related questions required the construction of so-called "dummy" variables for use in a predictor model. This is a common statistical process whereby categorical data may be coded in a way that makes it statistically useful. The variables were created such that the presence of a particular diagnosis was coded as "1" and its absence (all other cases) was coded as "0." This was done for all diagnostic categories for which there were more than five cases; for mathematical reasons, having less than five cases in a group is statistically inappropriate.

Bipolar disorder was significantly associated with placement in RTF; oppositional defiant disorder was significantly associated with placement in TGH. No other diagnostic categories were significantly associated with placement in either type of facility. This univariate finding indicated that bipolar disorder was a good candidate for inclusion in a multivariate model predicting

placement in RTF. Moreover, since a larger percentage of cases with ADHD were placed in RTF, this diagnosis was also included in the predictor model even though the finding was not significant ($p > .05$).

SERVICE-RELATED VARIABLES

Table 7 provides thorough descriptive information for all cases with regards to service-related variables; footnotes explain significant findings. All continuous level variables which could logically predict placement in RTF or TGH were subjected to t-tests. This essentially compared the averages reported in Table 7; the averages for TGH reported below differ very slightly from those in the table because, for the following analysis, the small number of TFH cases was included with TGH cases. Exploring relationships between these variables and facility type was the first step in determining variables for inclusion in more sophisticated multivariate models designed to predict placement in RTF.

The average length of stay (number of days in placement) differed significantly ($p < .00$) between RTF (104) and TGH (228). There were no statistically significant differences ($p > .05$) between the following variables with regards to placement in RTF versus TGH: average total number of prior placements (RTF 3.54, TGH 3.97); average number of prior therapeutic placements (RTF 1.33, TGH 1.17); average number of prior non-therapeutic placements (RTF 2.33, TGH 2.83); average number of offenses prior to placement (RTF 7.7, TGH 8.6); average number of intakes prior to placement (RTF 5.64, TGH 6.06); average number of services received prior to placement (RTF 1.66, TGH 2.01); and average score for the most recent Back On Track (BOT) assessment prior to placement (RTF 2.60, TGH 2.69). While no significant differences existed (beyond average length of stay), indicating that their strength as predictor variables was questionable, several of these variables were later included as potential predictors in the multivariate model to determine if they significantly predicted placement in RTF when considered as a group.

One particular variable of interest, number of services received prior to placement, raised a concern with regards to data quality. Forty-seven percent of cases placed in either RTF or TGH reported zero prior services. It is highly unlikely that this large percentage received no services; however, at this time, districts are only required to record those services that are paid for with OCA funds. All juvenile offenders who are placed with a court order are automatically eligible for Medicaid and thus, many of their services are paid for with Medicaid funds. Therefore, it is likely that the Medicaid-funded services are not being tracked accurately within the JCATS system, failing to genuinely portray all services received by youth within the Montana juvenile probation system.

OFFENSE-RELATED VARIABLES

The variable “most serious offense” was re-coded into 12 major categories to facilitate the reporting of thorough descriptive information for all cases and render it useful as a set of predictor variables. For all facilities combined, assault was the most serious offense for 77 cases, including: misdemeanor assault (43); aggravated assault felony (2); assault on a peace/judicial officer (11); and assault with a weapon (21). The combined offenses of burglary and theft comprised another 77 cases. PFMA received its own category composed of 72 cases. Sexual offenses represented 42 cases with the following offenses included: felony incest (5); sexual assault (7); sexual assault victim under 16 (8); sexual intercourse without consent (21); and indecent exposure (1). Substance-related offenses represented 25 cases including the following offenses: criminal distribution of dangerous drugs on/near a school (2); criminal possession of dangerous drugs/marijuana (6); criminal distribution of imitation dangerous drugs to person under 18 (2); criminal distribution of

Table 7	RTF N=142 (38.7%)	TGH N=149 (40.6%)	CDF N=68 (18.5%)	TFH N=8 (2.2%)	Total N=367 (100.0%)
SERVICE-RELATED VARIABLES					
Placement location					
In-state	121 (85.2%)	122 (81.9%)	59 (86.8%)	8 (100.0%)	310 (84.5%)
Out-of-state	21 (14.8%)	27 (18.1%)	9 (13.2%)	0 (0.0%)	57 (15.5%)
Days in placement¹					
<i>Mean</i>	104.06	228.33	34.37	113.14	138.00
Total number of prior placements					
<i>Mean</i>	3.54	3.97	3.03	3.12	3.62
Number of prior therapeutic placements					
<i>Mean</i>	1.33	1.18	0.48 ²	-----	1.11
Number of prior non-therapeutic placements					
<i>Mean</i>	2.23	2.83	2.45	2.25	2.51
Number of offenses prior to placement					
<i>Mean</i>	7.69	8.84	10.37 ³	4.38	8.68
Number of offenses after placement					
<i>Mean</i>	2.45	2.21	2.80	0.43	2.43
Number of intakes prior to placement					
<i>Mean</i>	5.64	6.18	7.78 ⁴	4.00	6.27
Number of intakes after discharge					
<i>Mean</i>	1.96	2.08	2.25	0.38	2.06
Number of services received prior to placement					
<i>Mean</i>	1.66	2.07	3.49 ⁵	0.75	2.18
Number of services received after placement					
<i>Mean</i>	1.11	1.21	2.51	1.12	1.42

¹ There was a significant difference ($p < .00$) between the mean number of days in RTF and TGH; cases in RTF had a substantially shorter mean length of stay than those in TGH.

² Cases placed in CDF had significantly fewer prior therapeutic placements than those placed in TGH ($p < .01$) or RTF ($p = .00$).

³ Cases placed in CDF committed significantly more offenses prior to placement ($p < .05$) than those placed in RTF; there was no significant difference with those placed in TGH ($p > .05$).

⁴ Cases placed in CDF had significantly more intakes prior to placement ($p < .05$) than those placed in RTF; there was no significant difference with those placed in TGH ($p > .05$).

⁵ Cases placed in CDF received significantly more services prior to placement than those in RTF ($p < .00$) and TGH ($p = .01$).

dangerous drugs (2); criminal distribution of dangerous drugs/opiate (2); criminal possession of intoxicating substances under age 18 (2); criminal possession of drug paraphernalia (1); criminal

production or manufacture of dangerous drugs (3); criminal sale of dangerous drugs (3); and MIP alcohol (2).

The following offenses received their own categories: criminal mischief (16); intimidation (12); criminal endangerment (12); disorderly conduct (9); arson (5); and robbery (5). Uncategorized offenses represented 13 cases with the following offenses included: unauthorized use of a motor vehicle (3); forgery (1); false report to law enforcement (1); escape from detention (1); public nuisance (1); resisting arrest (4); possession of a deadly weapon (1); and carrying a concealed weapon (1).

All offenses were cross-tabulated with placement in either RTF or TGH; a chi-square statistic determined that there was an overall significant association ($p < .05$) between most serious offense and placement type. The data was further examined to determine which specific offenses were predicting placement, and dummy variables were constructed for each of the above 12 categories for use in a predictor model.

PFMA was significantly associated ($p < .05$) with placement in RTF. Sexual offenses were significantly associated ($p < .00$) with placement in TGH. No other offenses were individually significantly associated with placement in either type of facility. This univariate finding indicated that PFMA was a good candidate for inclusion in a multivariate model predicting placement in RTF. Moreover, a disproportionate percentage of assault cases were placed in RTF, which, though not significant ($p > .05$), established a conceptual basis for including assault in the predictor model as well.

Appendix 3: Predicting Placement in RTF

The researchers chose binary logistic regression as the statistical procedure for the multivariate model predicting placement in RTF. This procedure is appropriate when the dependent, or outcome, variable for the model is dichotomous (TGH=0, RTF=1) and the independent, or predictor, variables may be either dichotomous or continuous. Examples of dichotomous variables include dummy variables such as “Bipolar_Other” (other=0, bipolar=1) and “PFMA_Other” (other=0, PFMA=1). Examples of continuous variables include “number of prior intakes” and “age at placement.”

For statistical reasons, the standing hypothesis for all variables was that they did not predict placement in RTF. Testing sought to rule this out. A beta coefficient, significance level and odds ratio were established for each predictor in the model. The beta is a standardized measurement of the power of a predictor; the significance level indicates whether or not the finding could have occurred by chance (if it did not [$p < .05$] the standing hypothesis is rejected and it is established that the variable is a significant predictor). The odds ratio indicates the likelihood that an individual with the predictor condition will be placed in RTF compared to those without the condition. An odds ratio of 1.0 would indicate that the predictor variable had no effect on placement in RTF.

The researchers established criteria for inclusion of variables in the multivariate model predicting placement in RTF. All variables were considered, and those that exhibited a significant univariate association with placement in either RTF or TGH were included first. The researchers also included any variable which provided a sound conceptual basis to hypothesize that a relationship could exist between the variable and placement in RTF despite its lack of a significant univariate association. In a multivariate model, some variables that do not exhibit a significant univariate relationship may become predictive when combined with others.

Any variables for which there were less than five cases in a category and any that portrayed events or indicators that occurred after placement (i.e., number of offenses after placement, days in placement) were excluded from the model. Also excluded were variables that did not appear to hold any predictive power and only introduced statistical “noise” into the model (for example, judicial districts). Model 1 indicates that there were four significant variables in the multivariate model predicting placement in RTF.

The results of the multivariate model predicting placement in RTF indicate that cases with PFMA as the most serious offense were 3.33 times more likely to be placed in RTF than those with a different most serious offense. In other words, the risk of being placed in RTF is 3.33 times higher for juvenile offenders whose most serious offense is PFMA than for those with another offense. Cases where the most serious offense was assault were 2.90 times more likely to be placed in RTF than those with a different most serious offense. Those convicted of burglary were 2.89 times more likely to be placed in RTF than those with a different most serious offense. Cases with a diagnosis of bipolar disorder were 2.96 times more likely to be placed in RTF than those with any different primary diagnosis.

Model 1: Binary Logistic Regression for Predicting Placement in RTF

PREDICTOR VARIABLES	Beta Coefficient	Significance Level	Estimated Odds Ratio
Demographic			
<i>Age at placement</i>	-.12	.170	.89
<i>Race</i>	.01	.981	1.01
<i>Gender</i>	-.02	.963	.99
Diagnostic			
<i>Bipolar disorder</i>	1.08	*.001	2.96
<i>ADHD</i>	.52	.359	1.67
<i>Major depressive disorder</i>	.55	.184	1.73
Service-Related			
<i>Number of prior intakes</i>	.26	.720	1.03
<i>Number of prior therapeutic placements</i>	.10	.244	1.11
<i>Number of prior non-therapeutic placements</i>	-.02	.740	.98
<i>Number of services received prior to placement</i>	-.02	.707	.98
Offense-Related			
<i>PFMA</i>	1.20	*.005	3.33
<i>Assault</i>	1.07	*.004	2.90
<i>Burglary</i>	1.06	*.007	2.89
<i>Misdemeanor/Felony</i>	.13	.713	1.14
<i>Number of offenses prior to placement</i>	-.06	.281	.94

* significant at the p<.01 level

Appendix 4: Predicting Out-of-State Placement in RTF or TGH

As previously indicated in Table 7, 84.5 percent of cases were placed in state and 15.5 percent of cases were placed out of state. The number and percentage of cases from each district that were placed in state versus out of state are displayed in Table 8.

Table 8	Number and Percent of Cases Placed In-State	Number and Percent of Cases Placed Out-of-State	Total Number of Cases Placed
District			
1	22 (100.0%)	0 (0.0%)	22
2	22 (95.7%)	1 (4.3%)	23
3	11 (91.7%)	1 (8.3%)	12
4	41 (87.2%)	6 (12.8%)	47
5	0	0	0
6	2 (100.0%)	0 (0.0%)	2
7	2 (100.0%)	0 (0.0%)	2
8	66 (93.0%)	5 (7.0%)	71
9	6 (100.0%)	0 (0.0%)	6
10	1 (100.0%)	0 (0.0%)	1
11	29 (61.7%)	18 (38.3%)	47
12	13 (76.5%)	4 (23.5%)	17
13	26 (92.9%)	2 (7.1%)	28
14	0	0	0
15	0 (0.0%)	1 (100.0%)	1
16	4 (100.0%)	0 (0.0%)	4
17	22 (78.6%)	6 (21.4%)	28
18	9 (90.0%)	1 (10.0%)	10
19	18 (90.0%)	2 (10.0%)	20
20	11 (55.0%)	9 (45.5%)	20
21	3 (100.0%)	0 (0.0%)	3
22	2 (66.7%)	1 (33.3%)	3
Total	310 (84.5%)	57 (15.5%)	367

The researchers again chose binary logistic regression as the statistical procedure for the multivariate model predicting out-of-state placement. As with predicting placement in RTF, this procedure is most appropriate when the outcome variable consists of two categories (in-state=0, out-of-state=1); predictor variables may be either dichotomous or continuous, and both were used for this model.

Criteria for determining which variables to include in the model were similar to those established for predicting placement in RTF. Further preliminary t-tests and chi-squares were conducted and variables that exhibited a significant univariate association with placement either in state or out of state were included, as were those for which there was a sound conceptual basis to

hypothesize that a relationship could exist between the variable and placement out of state. As when predicting placement in RTF, variables with less than five cases in a category, those that portrayed events or indicators that occurred after placement, and variables that did not appear to hold predictive power were excluded.

Preliminary analysis of continuous variables utilizing t-tests resulted in a significant univariate association between the results of the most recent BOT before placement and placement either in state or out of state. Preliminary analysis of categorical variables using chi-square statistical testing resulted in a significant univariate association between two variables, sex offense/no sex offense and misdemeanor/felony, and placement either in state or out of state.

The standing hypothesis for all variables was that they did not predict placement in an out-of-state facility. A beta coefficient, significance level and odds ratio were established for each predictor in the model. Model 2 indicates that there was one significant predictor for out-of-state placement.

Model 2: Binary Logistic Regression for Predicting Out-of-State Placement

PREDICTOR VARIABLES	Beta Coefficient	Significance Level	Estimated Odds Ratio
<i>Demographic</i>			
<i>Age at placement</i>	-.054	.679	.95
<i>Native American/White</i>	-.589	.219	.56
<i>Gender</i>	-.188	.692	.83
<i>Diagnostic</i>			
<i>Posttraumatic Stress Disorder</i>	.313	.631	1.37
<i>Oppositional Defiant Disorder</i>	.126	.815	1.14
<i>Dysthymic Disorder</i>	.757	.165	2.13
<i>Service-Related</i>			
<i>Number of prior intakes</i>	-.078	.391	.93
<i>Number of prior therapeutic placements</i>	.185	.121	1.20
<i>Number of prior non-therapeutic placements</i>	-.093	.238	.91
<i>Number of services received prior to placement</i>	-.009	.896	.99
<i>Results of most recent BOT before placement</i>	-.014	.232	.99
<i>Offense-Related</i>			
<i>Sex Offense</i>	1.546	*.002	4.69
<i>Misdemeanor/Felony</i>	.587	.179	1.80
<i>Number of offenses prior to placement</i>	.108	.096	1.11

* significant at the p<.01 level

The results of the multivariate model predicting out-of-state placement indicate that cases with a sex offense as the most serious offense were 4.69 times more likely to be placed in an out-of-state facility than those with a different offense. That is, the risk of being placed out of state was 4.69 times higher for cases where the most serious offense was sexual in nature than for those with a non-sexual crime.

Diagnostically, only 7.1 percent of sex offenders had a primary diagnosis of a specific sexual disorder, such as a paraphilia. The most prevalent diagnosis was bipolar disorder, representing 21.4 percent of cases; dysthymic disorder was primary for 16.7 percent of cases; another 14.3 percent of cases reported PTSD as their primary diagnosis; and the remaining cases were distributed across a variety of diagnoses. This did not differ significantly from the non-sex-offender juveniles, though dysthymic disorder was somewhat overrepresented in those cases.

Given the predictive power of the sex offense variable, this association was further explored. Forty-two total cases reported a conviction for a sex-related crime. Facility location (in-state or out-of-state) was cross-tabulated with sexual offense, demonstrating that the percentage of cases placed in out-of-state facilities with a sex crime as the most serious offense was 38.1 percent (16 of the 42 cases). By comparison, excluding sex offense cases, only 12.4 percent of all placements were out of state. Of those 16 sex offense cases placed out of state, 68.8 percent (11 cases) were placed at Normative Services in Wyoming; 12.5 percent (two cases) were placed at Psych Solutions in Texas; 6.25 percent (one case) were placed at Mingus Mountain Academy in Arizona; 6.25 percent (one case) were placed at Oaks Psychiatric Hospital in Texas; and 6.25 percent (one case) were placed at Southern Peaks Treatment Center in Colorado. See Table 9 for placement information on all sex offender cases.

Table 9	Percentage of Cases in Facility	Number of Cases in Facility
OUT-OF-STATE FACILITIES WITH SEX OFFENDERS		
Normative Services, Wyoming	68.75%	11
Psych Solutions, Texas	12.50%	2
Mingus Mountain Academy, Arizona	6.25%	1
Oaks Psychiatric Hospital, Texas	6.25%	1
Southern Peaks Treatment Center, Colorado	6.25%	1
Total for Out-of-State	100.00%	16
IN-STATE FACILITIES WITH SEX OFFENDERS		
Alternative Youth Adventures: Journey Boys Group Home, Boulder	23.07%	6
Excel Inc.-West Group Home, Billings	19.23%	5
Excel Inc.-East Group Home, Billings,	11.54%	3
Missoula Youth Homes: Susan Talbot Center I, Missoula	7.69%	2
AWARE: Alpine Group Home, Great Falls	7.69%	2
Innerroads Wilderness Program, Missoula	3.85%	1
Missoula Youth Homes, Missoula	3.85%	1
Missoula Youth Homes: Radtke Treatment Center, Missoula	3.85%	1
REM: Miles Avenue Group Homes, Billings	3.85%	1
Shodair Children's Hospital, Helena	3.85%	1
Sinopah Group Home, Kalispell	3.85%	1
Teen Recover Center, Missoula	3.85%	1
Youth Dynamics Inc., Billings	3.85%	1
Total for In-State	100.0%	26

Appendix 5: Predicting Days in Placement

The researchers chose multiple linear regression as the statistical procedure for the multivariate model predicting days in placement. This procedure is most appropriate when the outcome variable (days in placement) is a continuous-level variable (in this study it was between 1 and 900 days). Predictor variables are assumed to be continuous, that is, not categorical. However, dummy variables may be used as predictors in order to assess the significance of the variable, but not the beta or the estimated odds ratio. In essence, the researchers were able to establish the predictive significance of dummy variables but not necessarily interpret their strength.

As with the models for predicting placement in RTF and in an out-of-state facility, all variables were considered for inclusion in this model. Those that exhibited a significant univariate association with days in placement were included, as well as any variable for which there was a sound conceptual basis to hypothesize that a relationship could exist between the variable and days in placement. As in the models above, variables with less than five cases in a category, those that portrayed events or indicators that occurred after placement, and variables that did not appear to hold predictive power were excluded.

Preliminary analysis of continuous variables utilizing simple univariate regression, also called correlation, resulted in a significant association between the number of prior therapeutic placements and days in placement ($r, -.13; p < .05$). This indicated that the greater the number of therapeutic placements a case had prior to the placement in question, the fewer days they were likely to have spent in the current placement. An effort was undertaken to determine if there was a significant difference in the average number of days in placement for various categorical variables. T-tests indicated that there were significant differences in average number of days in placement for gender, sex offense, PFMA, misdemeanor/felony, in-state/out-of-state, bipolar disorder, oppositional defiant disorder and major depressive disorder. These variables were all excellent candidates for inclusion in the predictor model.

The standing hypothesis for the multivariate model was that no variable would predict a greater number of days in placement. A significance level was determined, indicating whether or not the finding could have occurred by chance. Model 3 indicates that there were four significant predictors in the model.

The results of the multivariate model predicting days in placement indicate that sex offense, number of prior therapeutic placements (negative association), out-of-state placement and bipolar disorder significantly predict a greater number of days in placement, though the strength of these variables cannot be accurately determined using multiple linear regression. Nonetheless, an analysis of variance for the full model was significant ($p < .00$), validating its predictive value, and the "R square" statistic indicates that this set of predictors is accounting for .263 of the total variance in the outcome variable; this is considered very good for this kind of data, indicating a fairly robust finding.

Model 3: Multiple Linear Regression for Predicting Days in Placement

PREDICTOR VARIABLES	Significance Level
Demographic	
<i>Age at placement</i>	.433
<i>Native American/White</i>	.995
<i>Gender</i>	.990
Diagnostic	
<i>Bipolar Disorder</i>	** .004
<i>Oppositional Defiant Disorder</i>	.781
<i>Major Depressive Disorder</i>	.287
Service-Related	
<i>Number of prior intakes</i>	.383
<i>Number of prior therapeutic placements</i>	* .030
<i>Number of prior non-therapeutic placements</i>	.658
<i>Number of services received prior to placement</i>	.575
<i>Results of most recent BOT before placement</i>	.981
<i>In-state/Out-of-state facility</i>	*** .000
Offense-Related	
<i>Sex Offense</i>	* .036
<i>PFMA</i>	.672
<i>Number of offenses prior to placement</i>	.094
<i>Felony/Misdemeanor</i>	.642

* significant at the p<.05 level

** significant at the p<.01 level

*** significant at the p<.00 level

Appendix 6: Predicting Recidivism

For the purposes of this study, recidivism is defined as an offense committed by a case after discharge from the most recent facility. Recidivism may also be defined as the period of time between the start of a service or a placement and re-offense, but in this study it begins at discharge. At the time this data was extracted from JCATS, on February 23, 2009, 335 of the 367 (91%) cases had been discharged from the facilities in which they had been placed. Of the 335 cases discharged, 53.7 percent had re-offended, or recidivated. The recidivism rate for RTF (60.4%) was significantly higher than that for TGH (43.3%). The highest recidivism rate was for CDF cases in which 65.7 percent of the 67 discharged cases had re-offended; this was significantly higher than the other programs. Of primary concern, however, was understanding recidivism for RTF and TGH cases. For these cases, 136 of 268 discharged cases recidivated (50.7%). The average number of days between discharge and re-offense was 104 days with 25 percent of these cases recidivating within one month of discharge (29 days). Fifty percent of cases that recidivated did so at 77 days or less.

Table 10	Number of cases committing crime	Percent of cases committing crime
POST-PLACEMENT OFFENSES		
Criminal Contempt	20	15.7%
Disorderly Conduct	18	14.2%
Burglary/Theft	17	13.4%
Assaults	16	12.6%
Runaway Juvenile	15	11.8%
Substance-related	9	7.1%
PFMA	8	6.3%
Criminal Mischief	8	6.3%
Other	8	6.3%
Ungovernable Juvenile	5	3.9%
Unauthorized Use of a Motor Vehicle	3	2.4%
TOTAL (without missing cases)	127	100.0%

Dummy variables were created for “first post-placement offense” for those who recidivated, making it possible to cross-tabulate these variables and determine whether or not there was an association between first post-placement offense and placement in RTF, out-of-state placement and diagnosis. A chi-square test of association determined that there was no statistically significant association between first post-placement offense and placement type (RTF, TGH) or being placed in state or out of state. A series of t-tests determined that there was no significant difference in the average length of stay for cases with different first post-placement offenses.

Each pre-placement diagnosis was cross-tabulated with each post-placement offense to determine if a particular diagnostic category placed a juvenile offender at increased risk for a particular type of crime. A diagnosis of oppositional defiant disorder was significantly associated with assault ($p < .05$). Therefore, juvenile offenders with this diagnosis must be considered at higher risk for committing an assault crime post-placement. Moreover, dysthymic disorder was significantly associated with criminal contempt ($p < .05$), indicating that cases with this diagnosis were at a higher risk for a contempt ticket.

Cross-tabulations explored the possibility of an association between the most serious offense committed prior to placement and the first offense committed post-placement. Cases with a sex offense as their most serious crime were at significantly higher risk for criminal contempt ($p < .05$). Cases whose most serious offense prior to placement was assault were at higher risk to commit an assault as their first crime when they recidivated ($p < .001$). Of the eight cases that recidivated by committing a PFMA, seven had committed the same crime as the most serious offense prior to placement, which was a significant association ($p < .05$). Finally, there was a

significant association between cases committing either theft or burglary as the most serious offense prior to admission and the same crime as the first post-placement offense ($p < .05$).

A series of t-tests found a significant difference between the average number of days to recidivism for a post-placement offense of theft or burglary and all other offenses. Those who recidivated with a theft or burglary crime did so in an average of 54.2 days, while those committing all other crimes post-placement did so in an average of 106.9 days ($p < .05$). There was no significant difference in the average number of days to recidivism for any other first offense committed post-placement when the length of time between discharge and recidivism for that offense was compared to the average length of time for all other offenses.

For RTF and TGH cases (excluding CDF), preliminary t-test analysis for continuous variables comparing recidivists (R) with non-recidivists (NR) indicated that there were significant differences between the groups with regards to the following variables: number of offenses prior to placement (R 10.0, NR 7.0); days in placement (R 112.0, NR 167.0); number of prior non-therapeutic placements (R 2.8, NR 2.1); number of prior services received (R 4.3, NR 2.9); number of intakes prior to placement (R 7.7, NR 4.5); and the total number of intakes (R 11.0, NR 5.0). These significant differences indicated that these variables would be appropriate for inclusion in a multivariate predictor model. Variables for which there was no significant difference between the two groups were generally excluded from the model.

In the multivariate predictor model, the variables that reflected events that occurred after discharge proved problematic as predictors. For example, with regards to the variable "number of intakes after discharge," there was a significant difference in the average number of intakes between recidivists and non-recidivists; due to the nature of the variable, non-recidivists had zero intakes after discharge, which confounded the mathematical model. Therefore these variables were not included in the multivariate model.

Using preliminary chi-square test analysis, the researchers were able to compare recidivists and non-recidivists across other individual categorical variables. Three variables, RTF/TGH, PTSD diagnosis and in-state/out-of-state placement, showed a significant association with recidivism ($p < .05$). Cases placed in RTF were more likely to recidivate, cases with a diagnosis of PTSD were less likely to recidivate, and cases with out-of-state placements were also less likely to recidivate. Other variables with a nearly significant association were included in the multivariate predictor model.

Binary logistic regression was chosen as the statistical procedure for the multivariate model predicting recidivism. Criteria for determining which variables to include in the model were similar to those established for the other models. Variables that exhibited a significant univariate association with recidivism were included, as were those for which there was a sound conceptual basis to hypothesize that a relationship could exist between the variable and recidivism. As with the other predictor models, variables with less than five cases in a category, those that portrayed events or indicators that occurred after placement, and variables that did not appear to hold predictive power were excluded.

The standing hypothesis for all variables was that they did not predict recidivism. A beta coefficient, significance level and odds ratio were established for each predictor in the model. Model 4 indicates that there were three significant predictors of recidivism.

Model 4: Binary Logistic Regression for Predicting Recidivism

PREDICTOR VARIABLES	Beta Coefficient	Significance Level	Estimated Odds Ratio
Demographic			
<i>Age at placement</i>	.002	.985	1.002
<i>Native American/White</i>	.091	.839	1.095
<i>Gender</i>	-.263	.442	.769
Diagnostic			
<i>Posttraumatic Stress Disorder</i>	-.272	.628	.762
<i>Bipolar Disorder</i>	-.502	.148	.605
Service-Related			
<i>Number of prior intakes</i>	.221	*.014	1.247
<i>Number of prior therapeutic placements</i>	-.009	.927	.991
<i>Number of prior non-therapeutic placements</i>	-.007	.917	.993
<i>Number of services received prior to placement</i>	.068	.295	1.071
<i>In-State/Out-of-State</i>	-.302	.516	.739
<i>Days in Placement</i>	-.004	*.012	.996
<i>RTF/TGH</i>	.745	*.030	2.107
Offense-Related			
<i>Sex Offense</i>	-.076	.929	.927
<i>PFMA</i>	.587	.154	1.798
<i>Misdemeanor/Felony</i>	.490	.531	1.632
<i>Number of offenses prior to placement</i>	-.047	.895	1.001
Interaction/Control Variable			
<i>Days in Placement * Sex Offender/Other</i>	.005	.102	1.005

* significant at the p<.05 level

The results of the multivariate model predicting recidivism indicate that there was a significantly increased likelihood of recidivism for cases with a higher number of intakes before placement. Each additional intake increased the likelihood of recidivism 1.24 times. In addition, a case with fewer days in placement had a slight, but significant, increase in risk for recidivism. The more powerful finding, however, was that cases that were placed in RTF were 2.10 times more likely to recidivate than those placed in TGH. Considered together, these findings indicate that cases with a higher number of intakes, a shorter number of days in placement, and a placement in RTF were at highest risk to recidivate.

The initial version of this predictor model indicated that having committed a sex offense was a significant predictor of recidivism. However, given that there was no univariate association between sex offense and recidivism, methodological guidelines for the construction of binary logistic regression models indicated that the sex offense variable was likely interacting with another

variable in the model, causing sex offense to falsely appear as a positive predictor of recidivism. Subsequent iterations of the model indicated that sex offense was interacting with days in placement, resulting in this false positive. Therefore, an interaction variable, consisting of days in placement multiplied by sex offense, was created and entered into the model to control for the false positive. Being a sex offender was rendered non-significant, while the variable “days in placement” remained a significant, though somewhat weaker, predictor in the final model. Nonetheless, these results indicate that youth with a sex offense conviction and a short length of stay in RTF may be at higher risk for recidivism.

Appendix 7: Number and Percentage of Juveniles Placed by District

Of the 6,244 unduplicated juvenile cases in fiscal year 2008, 252 (4.0%) were admitted to a facility. Table 11 displays the number of juvenile offenders and percent admitted to treatment by judicial district. For districts that had six or more admissions, the proportion of cases admitted was compared to the overall proportion for the state using a Fishers exact test. Two districts placed a significantly higher ($p < .05$) proportion of cases than the four percent statewide average: district 8 with 5.7 percent of cases and district 17 with 10.8 percent of cases. While other districts may have appeared higher (19 with 11.0%) or lower (1 with 3.2%), the statistical test took into consideration the sub-sample size and could not rule out that the obvious differences between those districts, and the overall statewide average, could not be due to chance.

Table 11	Total # of Juvenile Offenders in District for FY08	# and % of Juvenile Offenders Placed During FY08
District		
1	495	16 (3.2%)
2	297	19 (6.4%)
3	68	† 3 (4.4%)
4	759	35 (4.6%)
5	104	† 0 (0.0%)
6	137	† 2 (1.5%)
7	131	† 2 (1.5%)
8	587	* 48 (5.6%)
9	149	† 5 (3.4%)
10	93	† 1 (1.1%)
11	734	30 (4.1%)
12	209	10 (4.8%)
13	823	22 (2.4%)
14	33	† 0 (0.0%)
15	54	† 1 (1.9%)
16	262	† 4 (1.5%)
17	158	* 17 (10.8%)
18	334	† 6 (1.8%)
19	118	13 (11.0%)
20	274	12 (4.4%)
21	248	† 3 (1.2%)
22	177	† 3 (1.7%)
Total	6,244	252 (4.0%)

* significant at the $p < .05$ level

† These districts were not tested due to small sub-sample size.

Appendix 8: Diagnostic Criteria for Conduct Disorder

CONDUCT DISORDER:

Diagnostic Criteria

- A. A repetitive and persistent pattern of behavior in which the basic rights of others or major age-appropriate societal norms or rules are violated, as manifested by the presence of three (or more) of the following criteria in the past 12 months, with at least one criterion present in the past 6 months:

Aggression to people and animals

1. often bullies, threatens, or intimidates others
2. often initiates physical fights
3. has used a weapon that can cause serious physical harm to others (e.g., a bat, brick, broken bottle, knife, gun)
4. has been physically cruel to people
5. has been physically cruel to animals
6. has stolen while confronting a victim (e.g., mugging, purse snatching, extortion, armed robbery)
7. has forced someone into sexual activity

Destruction of property

8. has deliberately engaged in fire setting with the intention of causing serious damage
9. has deliberately destroyed others' property (other than by fire setting)

Deceitfulness or theft

10. has broken into someone else's house, building, or car
11. often lies to obtain goods or favors or to avoid obligations (i.e., "cons" others)
12. has stolen items of nontrivial value without confronting a victim (e.g., shoplifting, but without breaking and entering; forgery)

Serious violations of rules

13. often stays out at night despite parental prohibitions, beginning before age 13 years
 14. has run away from home overnight at least twice while living in parental or parental surrogate home (or once without returning for a lengthy period)
 15. is often truant from school, beginning before age 13 years
- B. The disturbance in behavior causes clinically significant impairment in social, academic, or occupational functioning.
- C. If the individual is age 18 years or older, criteria are not met for Antisocial Personality Disorder.

References

Shufelt, J. L., & Cocozza, J. J. (2006). Youth with mental health disorders in the juvenile justice system: Results from a multi-state prevalence study. Research and Program Briefs. Delmar, NY: National Center for Mental Health and Juvenile Justice.