Recidivism and SAT Program Completion: A Survival Analysis of Releases 2004 – 2009

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This study evaluates the relative influence of prisoner completion of Substance Abuse Treatment (SAT) on their likelihood to return to prison while controlling for other factors predictive of recidivism. The report begins with a description of the sampling methodology and measures. Group means and percentages of these measures are then presented and significant differences discussed. The report then describes basic correlations between each measure and recidivism. Finally, the report discusses the primary statistical estimation method and then considers the independent effects of each measure on the likelihood of recidivism.

SAMPLE

This study uses data from the Oklahoma Department of Corrections (ODOC) Offender Management System (OMS) and ODOC Programs Department, end of calendar year 2004 – 2009 program participation files. The base sample included all offenders released from prison between calendar years 2004 and 2009 with a moderate to high case plan need for substance abuse treatment during the incarceration from which they are being released (N=29,716). Since the sample consists of six years of prison releases, some offenders will be included multiple times in the final sample. The base sample included 5,062 offenders who completed SAT during the incarceration from which they are being released (17%).

From the base sample, offenders were removed for the following reasons: 1) missing prison admission date (which accounts for a 1.4% decrease in the non-SAT sample and a 0.5% decrease in the SAT sample), 2) erroneous movements (1.1% decrease non-SAT, 1.3% decrease SAT), 3) active out-of-state or federal detainers or warrants (3.6% decrease non-SAT, 2.7% decrease SAT), 4) total sentence length less than one year or delayed sentencing (12.5% decrease

non-SAT, 1.1% decrease SAT), 5) missing offender demographics (0.1% decrease non-SAT, 0.1% decrease SAT), and 6) erroneous percent of time served (1.7% decrease non-SAT, 1.4% decrease SAT).

The total selection effect for the non-SAT sample was a loss of 20.4% of the original base sample (final N = 19,626). Due to the size of the non-SAT sample, this loss of 20.4% results in statistically significant changes in most of the characteristics of the non-SAT sample; however, the majority of the changes lack substantive significance. For example, since short-term and delayed sentences were removed from the analysis, the average age of non-SAT sample participants increased from 34.4 years old to 36.3 years old. A complete evaluation of the non-SAT sample changes is provided in Appendix A.

The total selection effect for the SAT sample was a loss of 7.2% of the original base sample (final N = 4,699). Due to the smaller sample size and the smaller number of cases lost, only three SAT sample characteristics experienced a statistically significant change; however, these changes also lack substantive significance. A complete evaluation of the SAT sample changes is provided in Appendix B.

MEASURES

In order to gauge the relative influence of prisoner completion of Substance Abuse Treatment (SAT) on their likelihood to return to prison, other factors predictive of recidivism should be controlled. The following factors are commonly found to predict recidivism and are included in the analysis: age, gender, race, months in prison, percent of sentence length served, most serious offense type, prior adult incarcerations, supervision after release, institutional misconducts and serious mental illness. Table 2 contains the list of independent and dependent variables.

TABLE 1. Measures included in the analysis.

Independent Variables

AGE_ON_EXIT_DATE	Age of the offender at time of release
MALE	Coded 1 for Males and 0 for Females
NONWHITE	Coded 1 for Minorities and 0 for Caucasians
MTHS_IN_PRISON	Number of months spent in prison during present incarceration
PCT_TIME_SVD	Proportion of sentence served during present incarceration. Calculated as days in prison plus jail days credited divided by total sentence length.
For the following offense categories, most serious offenses were ranked as follows: 1) Violent, 2) Sexual Offense, 3) Property, 4) Drug, 5) DUI/Alcohol, 6) Other	
VIOL	Coded 1 if the offender's most serious offense this incarceration was a Violent offense and coded 0 for all others.
SEX_ALL	Coded 1 if the offender's most serious offense this incarceration was a Sexual offense and coded 0 for all others.
PROP	Coded 1 if the offender's most serious offense this incarceration was a Property offense and coded 0 for all others.
DRUG	Coded 1 if the offender's most serious offense this incarceration was a Drug offense and coded 0 for all others.
DUI_ALC	Coded 1 if the offender's most serious offense this incarceration was a DUI/Alcohol offense and coded 0 for all others.
OTHER	Coded 1 if the offender's most serious offense this incarceration was not previously categorized and coded 0 if previously categorized.
PRIOR_INCAR	Coded 1 if the offender had any prior adult incarcerations and 0 for first-time incarcerates.
PAROLE	Coded 1 if the offender released to parole supervision and 0 for all other release types.
PROB	Coded 1 if the offender released to probation supervision and 0 for all other release types.
STREET	Coded 1 if the offender released to no supervision and 0 for all other release types.
MHL	Coded 1 if the offender's most serious mental health level on file was C1 and coded 0 for all others.
MISCON_AX_HIGH	Coded 1 if the offender's rate of institutional misconducts was equal to or greater than 1 class A or class X misconduct per every 4 months of incarceration. Coded 0 if fewer misconducts.
SAT	Coded 1 if the offender completed the SAT program and coded 0 for all others.

Dependent Variables

DAYS_OUT	Number of days from release to either recidivism date or censor date (12/31/2009).
RETURN	Coded 1 if the offender returned to prison (recidivated) and coded 0 if the offender did not return to prison (censored).

FINDINGS

Sample Characteristics

Table 3. presents the descriptive statistics for both samples, and indicates if the differences between the two samples are statistically significant. The non-SAT sample is slightly older, includes more females and minorities, spent a longer time in prison, and is more likely to have prior incarcerations. The non-SAT sample also has a higher proportion of violent offender and sexual offenders, compared to the SAT sample which has a higher proportion of drug offenders and DUI offenders. Another difference includes release type, with the non-SAT sample more likely released to street compared to the SAT sample, which is more likely released to probation. The non-SAT sample also includes more seriously mentally ill offenders and offenders with a high rate of institutional misconducts. The overall return rate for the non-SAT sample is 20%, while the overall return rate for the SAT sample is 17%.

Table 3. Descriptive Statistics

MEASURE	Non-SAT	SAT	T-TEST STATISTICALLY SIGNIFICANT
AGE_ON_EXIT_DATE	36.36	35.63	YES
MALE	81%	85%	YES
NONWHITE	38%	31%	YES
MTHS_IN_PRISON	27.31	24.12	YES
PCT_TIME_SVD	49%	40%	YES
VIOL	21%	17%	YES
SEX_ALL	3%	1%	YES
PROP	27%	26%	YES
DRUG	38%	43%	YES
DUI_ALC	8%	12%	YES
OTHER	3%	1%	YES
PRIOR_INCAR	45%	41%	YES
PAROLE	17%	14%	YES
PROB	38%	54%	YES
STREET	46%	32%	YES
MHL	4%	2%	YES
MISCON_AX_HIGH	2.1%	0.4%	YES
DAYS_OUT	885.62	869.02	NO
RETURN	20%	17%	YES

Correlations

Table 4. presents the correlation coefficients of the complete final sample for each independent variable and the dependent variable RETURN, which indicates offender recidivism. While every correlation coefficient between the independent variables and recidivism is weak (less than 0.30), the correlation coefficients provide insight into the directionality of the bivariate relationship. For example, the correlation coefficient for AGE ON EXIT DATE is negative, indicating that as age increases the likelihood of recidivism decreases. There is a positive relationship between recidivism and the offender being MALE, indicating that males are more likely to recidivate than females. Although correlations do not control for the influence of other measures predictive of recidivism, one can begin to infer that completion of the SAT program while in prison reduces the likelihood of recidivism because the correlation coefficient between SAT and recidivism is negative.

Table 4.

MEASURE	CORRELATION TO RECIDIVISM
AGE ON EXIT DATE	-.137**
MALE	.051**
NON WHITE	.044**
MTHS IN PRISON	-.032**
PCT TIME SVD	-.045**
VIOL	Not significant
SEX ALL	Not significant
PROP	.067**
DRUG	-.045**
DUI_ALC	-.034**
OTHER	.029**
PRIOR INCAR	.061**
PAROLE	.058**
PROB	.017**
STREET	-.059**
MHL	.074**
MISCON AX HIGH	.047**
SAT	-.036**

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Estimation Method

Cox Proportional Hazards Model is the primary estimation method to determine the relative influence of prisoner completion of Substance Abuse Treatment (SAT) on their likelihood to return to prison while controlling for other factors predictive of recidivism. The Cox Proportional Hazards Model is a robust form of survival analysis that produces odds ratios that allow for examining the affect of different measures on survival time. The primary assumption of the model is proportional hazards. This assumption of proportionality not does mean that the hazards are constant over time, but the hazard slopes for two groups are parallel. To confirm the data did not violate the proportional hazard assumption, each measure was tested by creating a time-dependent covariate and ensuring the coefficient for this term was either 0 or non-significant. All measures were found to meet the proportional hazard assumption.

Survival Analysis

The results of the Cox Proportional Hazards Model are displayed in Table 5. Almost all measures were statistically significant, with the exception of months in prison and sexual offenses. For those measures coded 0/1, the odds ratios reflect the odds of recidivating for the group coded 1 compared to the group coded 0, controlling for other measures. For example, the odds ratio for MALE is 1.443, meaning that the odds of recidivism for males is about 44% higher than the odds for females, or 1.44 times the female hazard. For continuous independent variables, such as age, to calculate the percent change in the odds for one unit increase, subtract 1.0 from the odds ratio and multiply by 100. For example, the odds ratio for AGE ON EXIT DATE is 0.967, which means that [(0.967 – 1.0) * 100 = -3.3] for each one-year increase in age at release, the odds of recidivism goes down by an estimated 3.3%. In the case of offense types and release types, these are to be compared with the omitted category. For offense types the

omitted category is property offenses and for release types the omitted category is released to street/no supervision. For example, PAROLE indicates that offenders released to parole supervision have a 39.2% higher odds of recidivating than those released to no supervision. The most influential measure on the likelihood of recidivism was serious mental illness, with C1 offenders 2.62 times as likely to return to prison compared to non-C1 offenders. After controlling for all measures, offenders who completed the SAT program have 20% lower odds of returning to prison compared to offenders who did not complete the program.

Table 5. Survival Analysis: Cox Proportional Hazards Model

MEASURE	ODDS RATIO
AGE_ON_EXIT_DATE	0.967
MALE	1.443
NONWHITE	1.289
MTHS_IN_PRISON	not significant
PCT_TIME_SVD	0.556
VIOL	0.818
SEX_ALL	not significant
DRUG	0.708
DUI_ALC	0.751
OTHER	1.229
PRIOR_INCAR2	1.59
PAROLE	1.392
PROB	1.217
MHL	2.626
MISCON_AX_HIGH	1.733
SAT	0.807

CONCLUSION

This study specifically examined offenders with a moderate to high need for substance abuse treatment, as indicated on their case plan. The results of the analysis shows that completion of the SAT program reduces these offenders likelihood of returning to prison compared to those who did not complete the program, controlling for other measures predictive of recidivism.

APPENDIX A

NON-SAT SAMPLE CHARACTERISTIC CHANGES DUE TO SELECTION EFFECT			
MEASURE	**DATASET**	**MEAN**	**T-TEST STATISTICALLY SIGNIFICANT**
AGE_ON_EXIT_DATE	Final Sample	36.36	YES
	Base Sample	34.42	
MTHS_IN_PRISON	Final Sample	27.31	NO
	Base Sample	26.77	
PCT_TIME_SVD	Final Sample	0.487	YES
	Base Sample	0.573	
MALE	Final Sample	0.808	YES
	Base Sample	0.827	
NONWHITE	Final Sample	0.377	YES
	Base Sample	0.391	
VIOL	Final Sample	0.208	YES
	Base Sample	0.190	
SEX_ALL	Final Sample	0.033	YES
	Base Sample	0.029	
PROP	Final Sample	0.270	YES
	Base Sample	0.295	
DRUG	Final Sample	0.377	YES
	Base Sample	0.364	
DUI_ALC	Final Sample	0.085	YES
	Base Sample	0.073	
OTHER	Final Sample	0.028	YES
	Base Sample	0.049	
PRIOR_INCAR	Final Sample	0.453	YES
	Base Sample	0.404	
PAROLE	Final Sample	0.166	YES
	Base Sample	0.150	
PROB	Final Sample	0.377	YES
	Base Sample	0.430	
STREET	Final Sample	0.457	YES
	Base Sample	0.421	
MHL	Final Sample	0.042	NO
	Base Sample	0.039	
MISCON_AX_HIGH	Final Sample	0.020	YES
	Base Sample	0.024	
DAYS_OUT	Final Sample	885.62	NO
	Base Sample	882.91	
RETURN	Final Sample	0.201	NO
	Base Sample	0.206	

APPENDIX B

SAT SAMPLE CHARACTERISTIC CHANGES DUE TO SELECTION EFFECT			
MEASURE	**DATASET**	**MEAN**	**T-TEST STATISTICALLY SIGNIFICANT**
AGE_ON_EXIT_DATE	Final Sample	35.63	NO
	Base Sample	35.51	
MTHS_IN_PRISON	Final Sample	24.12	YES
	Base Sample	25.03	
PCT_TIME_SVD	Final Sample	0.400	YES
	Base Sample	0.431	
MALE	Final Sample	0.850	NO
	Base Sample	0.850	
NONWHITE	Final Sample	0.310	NO
	Base Sample	0.310	
VIOL	Final Sample	0.170	NO
	Base Sample	0.170	
SEX_ALL	Final Sample	0.010	NO
	Base Sample	0.010	
PROP	Final Sample	0.260	NO
	Base Sample	0.260	
DRUG	Final Sample	0.430	NO
	Base Sample	0.420	
DUI_ALC	Final Sample	0.120	NO
	Base Sample	0.110	
OTHER	Final Sample	0.010	YES
	Base Sample	0.020	
PRIOR_INCAR	Final Sample	0.410	NO
	Base Sample	0.410	
PAROLE	Final Sample	0.140	NO
	Base Sample	0.140	
PROB	Final Sample	0.540	NO
	Base Sample	0.540	
STREET	Final Sample	0.320	NO
	Base Sample	0.320	
MHL	Final Sample	0.020	NO
	Base Sample	0.020	
MISCON_AX_HIGH	Final Sample	0.004	NO
	Base Sample	0.005	
DAYS_OUT	Final Sample	869.02	NO
	Base Sample	861.82	
RETURN	Final Sample	0.170	NO
	Base Sample	0.170	