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Maryland Public Safety Compact

Recidivism Analysis Final Brief

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Points of view or opinions contained within this document are those of the author and do not necessarily represent the official position or policies of Baltimore's Safe & Sound Campaign, or the Maryland Department of Public Safety and Correctional Services. I want to thank Dr. James Austin for conducting a peer review of this document. All errors are my own.

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Executive Summary

Choice Research Associates was contracted by Baltimore's Safe & Sound Campaign to conduct an outcome evaluation of the Public Safety Compact (PSC). This brief focuses on measures of recidivism – post-release arrest, conviction and a sentence to 1 or more days of incarceration. This brief is the one part of the overall evaluation project; the second report exploring outcomes among PSC participants was finalized in March 2014.

This study examines a total of 472 individuals – 261 individuals served by PSC (the treatment group) and 211 individuals who were matched using quasi-experimental methods based on a calculated propensity score (which is the probability that they would have been in the treatment group if selected) from the universe of individuals (a total of 1,142) paroled between January 1, 2010 and June 30, 2010. A final comparison group of 211 parolees were compared to the 261 in the PSC treatment group. Data sources for this report include PSC program data provided by Safe and Sound and Criminal Justice Information System (CJIS) criminal history records provided by the Department of Public Safety & Correctional Services (DPSCS).

The method of analysis used to assess post-release outcomes is logistic regression, which provides a predicted probability of the outcome (recidivism) which is calculated based on all of the factors in the regression model. A second step was to conduct Cox regression survival analysis, which compares the treatment and comparison groups in their time to failure (a post-release event such as an arrest or conviction). The survival analysis seeks to determine whether those who did not participate in PSC "failed" (e.g., were re-arrested) sooner than those who did participate in PSC.

Key findings of this study are as follows:

- Participation in PSC has a significant impact on recidivism. Exploring one-year post-release recidivism outcomes among a sub-sample of 336 parolees (143 treatment and 193 control cases) with at least 12 months of follow-up data:
  - 29% of PSC participants were arrested compared to 41% of the control group;
  - 13% of PSC participants were convicted compared to 21% of the control group; and
  - 8% PSC participants were incarcerated compared to 17% of the control group.
- After controlling for key factors that may otherwise explain these finding (e.g., age and number of prior incarceration episodes), one year post release, the predicted *probability*[1] of arrest is reduced for those who participate in PSC. Specifically:
  - The probability that a PSC participant will be arrested is 26% compared to the probability of arrest for the control group at 41%. Overall, the probability of arrest is reduced by 16%;

[1] The probability of arrest is not the same as the hazard or risk of arrest. The ***probability*** of arrest is based on the cumulative, or the overall probability of a situation *occurring*. The ***risk*** of arrest considers the timing of the arrest, or the relative rate of this person failing given how long they have survived.

- The probability that a PSC participant will be arrested and convicted is 11% compared to the control group with a probability of 21%. Overall, the probability of conviction is reduced by 10%; and
- The probability that a PSC participant will be arrested, convicted and incarcerated is 6% compared to the control group with a probability of post-release incarceration of 16%. Overall, the probability of reincarceration is reduced by 10%.

❖ The Cox Regression survival analysis and survival plots among the full sample reveals that PSC participation reduces the hazard (or *risk*[1] of arrest) for all recidivism outcomes:

- The PSC treatment group had a 30% lower risk of arrest compared to the control group; one year post-release, 71% of PSC participants survived without an arrest compared to 60% of the comparison group;
- PSC participation significantly reduces the risk of having an arrest leading to conviction by 57%; one year post-release, 90% of PSC participants survived without an arrest leading to a conviction versus 80% of the comparison group; and
- Those who participate in PSC have a reduced risk of 66% for an arrest that leads to a sentence of 1 or more days incarcerated compared to the control group; one year post-release, 94% of PSC participants survived without an arrest leading to incarceration versus 84% of the comparison group.

In summary, those who participated in the Public Safety Compact are more successful than a matched control group in all areas of recidivism measured in this study. One-year post release, they are less likely to be arrested, convicted and incarcerated; and they survive longer in the community without a recidivist event than the comparison group.

Introduction

Choice Research Associates was contracted by the Baltimore's Safe & Sound Campaign to conduct an outcome evaluation of the Public Safety Compact (PSC). This brief focuses on measures of recidivism – measured as the arrest, conviction, and a sentence to incarceration. This brief is the first part of the overall evaluation project – a second report explored the outcomes among PSC participants was completed in March 2014.

The Public Safety Compact (PSC) is a public private partnership focusing on reentry that connects eligible inmates who are in need of substance abuse treatment (or have completed substance abuse treatment) to comprehensive, community-based after care, reentry supports, and community corrections services with a treatment focus—inmates receive and complete substance abuse treatment and cognitive behavioral therapy behind-the-fence. The PSC works with the Maryland Parole Commission (MPC) to secure the appropriate release of eligible participants; MPC approval is required for participation. Upon return to community, participants receive one year of case management and are screened for and referred to appropriate modalities of continued treatment and supportive services. The PSC is now sustained by savings generated by the safer and earlier release of its participants.

Methodology and Sample Descriptives

Data sources for this report include PSC program data provided by Safe and Sound and Criminal Justice Information System (CJIS) criminal history records provided by the Department of Public Safety & Correctional Services (DPSCS). This study examines a total of 472 individuals – 261 individuals served by PSC (the treatment group) and 211 individuals who were matched based on a calculated propensity score (which is the probability that they would have been in the treatment group if selected) from the universe of individuals (a total of 1,142) paroled between January 1, 2010 and June 30, 2010. Parolees from the comparison group all returned to be supervised by DPSCS in Baltimore City. While we have no data on the comparison group other than CJIS criminal history data, we believe the parolees received supervision and post-release services typically provided to parolees in Baltimore City. The propensity score was calculated using logistic regression based on 2 demographic measures (age and race) and 25 criminal history factors (e.g., first age at arrest, total number of arrests, number of times incarcerated). (Please refer to Figure 4 and Figure 5 in Appendix B for a technical report of the matching process.) The initial comparison group consisted of 355 individuals, but the list was then reviewed by DPSCS to ensure that these individuals were returned to Baltimore City (based on the designated community supervision office). A final comparison group of 211 parolees were compared to the 261 in the PSC treatment group, to discover whether there were significant differences in outcomes between the groups.

The method of analysis used to assess post-release outcomes is logistic regression, which provides a predicted probability of the outcome (recidivism) which is calculated based on all of the factors in the regression model. A second step was to conduct Cox regression survival analysis, which compares the treatment and comparison groups in their time to failure (a post-release event such as an arrest or conviction). Next steps will be discussed and a brief summary will conclude this report.

Study Participants - Demographics

Of the 1,622 State Identification (SID) numbers submitted to the Department of Public Safety and Correctional Services (DPSCS) for a Criminal Justice Information System (CJIS) criminal history data extract, 1,604 individuals had a criminal record and were matched. Among the initial 550 individuals in the PSC treatment group, 286 were dropped. These included 32 PSC participants not in the CJIS data (either were not matched or the SID number submitted was incorrect), 151 who were never released and 40 who, while initially approved for PSC, were designated as ineligible (due to subsequent infractions, home plan issues, participant lost interest, or were released without PSC) by the Parole Board prior to release and thus were never engaged in PSC, and another 63 who were released after January 11, 2013 -- the last date of any arrest activity in the CJIS data. The propensity matching resulted in a loss of 3 more treatment cases, with a final sample of 261 PSC participants. Table 1 provides descriptive information about those in the treatment sample.

The 261 PSC participants were on average 40 years old, (ranging in age from 21 to 61), the majority are male (95%), African American/Hispanic (90%) and Caucasian (10%).

Table 1: PSC Participant Demographic Descriptives N=261

	N	Freq.	Percent	Range	Mean (SD)
Age (as of June 14, 2013)	261			21 to 61	40.39 (8.3)
Gender – Male			95%	0 to 1	.95 (.22)
Race					
African American/Hispanic		235	90%		
White		26	10%		

N=Number of those with data available to assess.

Study Participants - Criminal History

Table 2 provides a number of measures of criminal history, based on data summarized from the CJIS criminal history data and the risk assessment data provided by DPSCS for those who participated in PSC.[2] The most current event recorded in the CJIS data was January 11, 2013. As of that date, the PSC participants had been released on average 13.9 months, ranging from less than 1 month to 33.8 months; (in days, they averaged 418 days since release within a range from 1 to 1,014 days).

Among the treatment group, the most common type of offender is a person offender (65%), followed by drug (33%), sex offender[3] (1%) and property (<1%). Note that this offender class is based on the most serious conviction over their criminal career and not on the most frequent type

[2] See Appendix A for the table containing the same detailed criminal history information for the comparison group.

[3] Sex offenders are specifically excluded from participation in PSC. However, prostitution is classified as a sex offense. Upon review of the specific sex offenses committed by those in the treatment group, we note that, excluding prostitution, all but one offense is a charge, not a conviction. The sole conviction was for a 4th degree sexual offense committed in 1988.

of crime or most recent offense committed.[4] The length of criminal career was based on the first date of arrest recorded in CJIS, and spanned a range from 435 days to over 33 years and on average, PSC participants had been criminally involved over 17 years.

The prior arrest history reflects this longevity. PSC participants had an average of 18 arrests (ranging from 1 to 62), 9 prior convictions and an average conviction rate of 50% overall. Among those convictions, approximately 38% were for felony level offenses and the maximum seriousness category averaged 4.26 – a Level IV offense within a range of Level I to Level VII.[5] Level IV offenses include arson, manufacture and/or distribution of controlled dangerous substances, second and third degree burglary, escape from confinement, and robbery.

Table 2 also provides arrest information broken down to provide charge data. PSC participants had an average of 41 charges (ranging from 4 to 110 charges) in their criminal career, with 13 charges resulting in a conviction (ranging from 1 to 58 charges convicted), thus 30% of all charges resulted in a conviction. Among these charges, 28% were for felony level offenses, and the most serious charge category averaged 3.66, which is a level V offense. Level V offenses include charges such as second degree assault; false statement to law enforcement officer; uttering false document; theft over $500; motor vehicle theft; possession of controlled dangerous substances (not marijuana); third degree sexual offense; weapons – illegal possession by convicted felon; and obstructing & hindering.

A breakdown by different types of offenses includes both the number of charges overall, within a range, and the number of those charges that lead to a conviction. Note that the offenses listed include person crimes (including weapons charges) and sex crimes (including prostitution). Given that weapons (due to their potential lethality) add a level of seriousness to the offense, and because prostitution is a fundamentally different type of sex offense than commonly thought of when referring to sex crimes (e.g., rape, sexual assault) both weapons and prostitution charges and convictions are provided separately so to present a balanced view.

The final section of Table 2 is incarceration history. Incarceration was defined as sentenced to one or more days.[6] On average, those in the treatment group had experienced from 1 to 31 periods of incarceration, on average serving close to 7 times. The total time imposed over the course of the participant's career ranges from 30 days to 82 years, with an average time imposed of 22.7 years. The average sentence per incarceration period is 178 days, but ranges up to 2.8 years.

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[4] In deciding which was the most serious conviction, person offenses were privileged over drug and property types of offenses. For the purpose of offense seriousness, DUI/DWI offenses, eluding police, etc., although designated as traffic for the offense type, were still considered as person offenses and thus were privileged over property, drug and other types of offenses. Thereafter, seriousness was determined based on the specific charges in accordance with the State of Maryland criminal law statutes.

[5] Each charge was coded by offense seriousness category from I (most serious) to VII (least serious) (which was reverse coded so that a higher value indicated a more serious crime) in accordance with Maryland State statutes. The source for statute classification information was from the Maryland State Commission on Criminal Sentencing Guidelines Manual Guidelines Offense Table Appendix A, updated February 2006, and the 2012 manual.

[6] Calculated from sentencing data by subtracting the sentence suspended from sentence imposed. However, there is no ability to discern in the CJIS data those sentences that were served consecutively from those served concurrently, thus these figures likely overestimate the amount of time actually served.

Table 2: PSC Participant Criminal History Descriptives N=261

	N	Freq.	Percent	Range	Mean (SD)
DPSCS Risk Data					
Age at First Involvement with Crime	261			8 to 44	18.32 (4.87)
Number of Juvenile and Adult Arrests	261			0 to 68	20.67(11.48)
Ratio: Number Prior Arrests/Current Age	261			0 to 2.19	.56 (.31)
CJIS Data					
Time Since Release	261				
Months Since Release				<1 to 33.8	13.9 (9.15)
Days Since Release				1 to 1014	418 (274)
Offender Class (Serious Conviction)	261				
Person		169	65%		
Sex		3	1%		
Drug		87	33%		
Property		2	<1%		
Criminal Career	261				
Length of Career (in months)[7]				14 to 404	205 (89)
Length of Career (in days)				435 to 12309	6254 (2713)
Arrest, Charge, and Conviction History					
Total Number of Prior Arrests	261			1 to 62	18.45 (9.87)
Total Number Prior Convictions - Arrest	261			1 to 36	8.90 (4.95)
Prior Arrest Conviction Rate	261			.15 to 1	.50 (.15)
Proportion of Prior Felony Convictions	261			0 to 1	.38 (.23)
Most Serious Category - Convictions	261			1 to 6	4.26 (.63)
Total Number of Prior Charges	261			4 to 110	41.13 (20.95)
Total Number Prior Convictions - Charges	261			1 to 58	13.27 (7.26)
Average Charges Per Prior Arrest	261			1 to 8.29	2.39 (.92)
Prior Charges Conviction Rate	261			.03 to .68	.30 (.12)
Proportion of Prior Felony Charges	261			0 to .63	.28 (.11)
Most Serious Category - Charges	261			1 to 6	3.66 (1.17)
Charge & Conviction History By Type of Offense					
Person Offenses (Including Weapons)					
Total Number of Charges	241			1 to 97	11.99 (12.36)
Total Number of Convictions	241			0 to 15	1.97 (2.49)
Weapons Only Offenses					
Total Number of Charges	167			1 to 34	3.94 (4.37)
Total Number of Convictions	167			0 to 5	.41 (.74)

[7] Length of criminal career was calculated based on the first date of arrest in the CJIS data to the most recent event. This most recent event was most often a post-release arrest or the date of release.

	N	Freq.	Percent	Range	Mean (SD)
Sexual Offenses (Including Prostitution)					
Total Number of Charges	18			1 to 9	2.39 (2.20)
Total Number of Convictions	18			0 to 4	.72 (1.17)
Prostitution Only Offenses					
Total Number of Charges	9			1 to 9	2.78 (2.68)
Total Number of Convictions	9			0 to 4	1.33 (1.41)
Drug Offenses					
Total Number of Charges	252			2 to 84	23.31 (13.56)
Total Number of Convictions	252			0 to 20	6.26 (3.82)
Property Offenses					
Total Number of Charges	242			1 to 57	11.23 (11.00)
Total Number of Convictions	242			0 to 27	2.65 (4.06)
Traffic Offenses					
Total Number of Charges	62			1 to 15	2.52 (2.57)
Total Number of Convictions	62			0 to 3	.34 (.72)
Total "Other" Charges					
Total Number of Charges	83			1 to 11	1.55 (1.32)
Total Number of Convictions	83			0 to 2	.33 (.56)
Total Violation Probation/Parole					
Total Number of Charges	227			1 to 21	3.51 (2.57)
Total Number of Convictions	227			0 to 17	2.89 (2.15)
Incarceration History					
Prior Times Incarcerated	260			1 to 31	6.86 (3.9)
Total Time Imposed (in days)	260			30 to 29930	8301 (5941)
Average Incarceration Sentence (in days)	260			6 to 1045	178 (143)

Differences Between Treatment and Comparison Groups

As noted above (and detailed in Appendix B) a comparison group was matched to the PSC treatment group using propensity scores including 27 demographic and criminal history variables. After conducting this match, there were eight variables where the treatment and comparison group differed significantly. There are no differences in demographics – the groups are equivalent in age, race and gender. However, the treatment group differed from the comparison group in that they were generally more serious offenders. For example, PSC participants had significantly more prior arrests (18.45 compared to 16.18 in the comparison group); a higher number of charges convicted (13.27 vs. 11.82) and had 1,752 more days in incarceration time than the comparison group (all significantly different at $p<.05$ or below). The treatment group had more drug convictions than the comparison group (3.82 vs. 3.39) and given the PSC target population is drug offenders, this is expected.

Second, days since release were different. The comparison group was expected to be unequal to the treatment group in days from release because they were released from January to June 2010. In contrast, only 16% of the treatment group was released in the same period. Among the remaining PSC participants, 38% were released in 2011, 44% in 2012 and a few (1.5%) in 2013. As a result of this difference, the logistic regression analysis was limited to the first 365 days post-release. In addition, given this difference in days from release, it was particularly important to examine these outcomes using hazard analysis, which allows one to account for these types of differences between the treatment and comparison groups. For this analysis, recidivism outcomes for those in the treatment and comparison group were examined in days to failure (measured as days to first arrest; days to first arrest that resulted in a conviction; and days to first arrest that resulted in incarceration) based on the number of individuals remaining in the analysis. A discussion of the analytical methods and the results of the recidivism analysis follow.

Table 3: Significant Differences between PSC and Comparison Group N=472

	Treatment Group			Comparison Group			Significant Difference
	N	**Mean**	**SD**	**N**	**Mean**	**SD**	
Criminal History							
Days Since Release	261	418	274	211	1020	50	-602***
Number of Prior Arrests	261	18.45	9.87	211	16.18	9.38	2.27*
Number of Charges Convicted	261	13.27	7.26	211	11.82	6.43	1.45*
Most Serious Off. Category – Charge	261	3.66	1.11	211	3.39	1.67	.27*
Most Serious Off. Category – Conviction	261	4.26	.63	211	4.11	.64	.15*
Number of Drug Convictions	252	6.26	3.82	206	5.53	3.39	.73*
Total Times Incarcerated	260	6.86	3.92	208	5.95	3.75	.91*
Incarceration Time Imposed (in days)	260	8301	5941	208	6459	5806	1752**

***Difference between those in the treatment group to those comparison group is significant p<.00
**Difference between those in the treatment group to those comparison group is significant p<.01
*Difference between those in the treatment group to those comparison group is significant p<.05

Research Design

Two methods of analysis were utilized to explore the impact of PSC Participation on three measures of recidivism – re-arrest, reconviction, and a sentence to 1 or more days of incarceration. CJIS criminal history data were analyzed with two principal statistical methods – logistic regression and Cox Regression (or survival/hazard modeling).

Given the use of quasi-experimental statistical methodology of propensity score matching in selecting the comparison group, there was generally no need to include the variables that were incorporated in the propensity score calculation, except for factors that remained statistically different between the comparison and treatment groups after creating the matched sample. In these cases, the analysis included measures to control for these relevant factors such as the length of criminal career.

The first method discussed is logistic regression, which predicts which of the three possible outcomes (arrest/no arrest; conviction/no conviction; incarceration/no incarceration) are going to occur, while accounting for information which remained significant after the propensity score matching. This is the advantage of multivariate regression – the method allows one to include variables that might explain the outcome (e.g., older offenders are less likely to recidivate, thus one would want to "control" for age in the analytic model).

The total number of days since release was highly significant between the treatment and comparison groups, and consequently overwhelmed the model so that the treatment effect was obscured. Given this, only cases included in the logistic regression were those in the treatment group who had been released by 1/11/2012, which was at least 12 months before the date of the last recorded event in the DPSCS data (1/11/2013). Then all post-release events that occurred after 365 days from release were eliminated for both the treatment and comparison groups. This allowed for an examination of the impact of PSC participation on arrest, conviction, and incarceration for a one year period following release.

As a result of only including cases with at least 12 months of follow-up data, 118 treatment cases were eliminated. As this was a loss of 45% of the treatment sample, the propensity score matching was repeated so that the comparison group more precisely matched this new treatment group. This process eliminated 18 control cases. (See Figure 6 and Figure 7 in the Propensity Score Technical Report in Appendix B for more information on this matching process.) The final sample available to conduct the logistic regression was 336 cases -- 143 treatment and 193 control cases.

The next analytic method employed was Cox Regression – also referred to as survival analysis. This method allows one to explore the timing of events, including the time for an individual to "fail" (in this case days to first arrest; days to the first arrest resulting in conviction; and days to the first arrest resulting in incarceration). This analysis is useful because it allows one to account for different starting points (e.g., you don't have to artificially eliminate subjects because they were released either before or after a period you want to observe). For this analysis, the treatment group was compared to the matched comparison group to ascertain whether PSC participation helped these previously incarcerated people remain in the community longer without a new arrest, and/or an arrest resulting in a conviction, and/or an arrest resulting in incarceration, than those in the comparison group.

Note that the probability of arrest -- derived from the logistic regression analysis -- is not the same as the hazard or risk of arrest. The ***probability*** of arrest is based on the cumulative, or the overall likelihood of a situation occurring**.** The ***risk*** of arrest, obtained in the survival analysis, considers the timing of the arrest, or the relative rate of this person failing given how long they have survived (*not* recidivated).

The first step in examining the role of PSC participation was to conduct a t-test to compare the average values of the recidivism outcomes between the two groups for one year post-release (Table 4). Then the effectiveness of PSC participation intervention was assessed as a discrete event (e.g., treatment vs. no treatment). Table 5 provides the results of the logistic regression and Table 6 provides the survival analysis. These results are detailed below.

Recidivism Analysis and Results

The first step to determine if there were differences between treatment and comparison group on recidivism outcomes was to conduct a t-test which compares the means on the three outcomes of arrest, conviction and incarceration post-release. Table 4 shows there are significant differences on 3 recidivism outcomes for those who participated in PSC versus those who did not over the 12 month follow-up period. Those in PSC were significantly less likely to be arrested (on average 29% versus 41% of the comparison group) convicted (13% vs. 21% convicted in the comparison group) or incarcerated (8% of the treatment group were sentenced to 1 or more days incarceration vs. 17% of the comparison group) post-release. Notably, for 9,682 prisoners released state-wide in 2011, recidivism rates calculated by DPSCS after the first year after release indicate rates consistent with the return to prison for the comparison group in this study – 16.6%.[8]

The differences outlined in Table 4 between the treatment and comparison group does not control for factors that may otherwise explain these findings. Thus, the next step is to look at this outcome by using multivariate regression analysis.

Table 4: Treatment & Comparison Differences: 12 Month Post-Release Recidivism N=336

	Treatment Group		Comparison Group		Significant Difference
	N	Percent	N	Percent	
Arrested Post-Release	143	29%	193	41%	-12%*
Convicted Post-Release	143	13%	193	21%	-9%*
Incarcerated Post-Release	143	8%	193	17%	-9%*

*Significant at p<.05

Logistic and Cox (Survival Analysis) Regression

Results: Logistic Regression – Treatment vs. Comparison

As indicated in Table 5, during the 12 month follow-up period, participation in PSC has a statistically significant impact on the likelihood that an individual will be arrested (significant at p<.05), convicted (p<.01), and incarcerated (p<.01) post-release. The treatment group has a significant lower probability of arrest, conviction, and incarceration.

For all three recidivism outcomes, the analysis controlled[9] for explanatory variables of age of participant, the total number of prior times incarcerated for 1 or more days, and a calculated ratio score[10] provided by DPSCS on the number of prior juvenile and adult arrests divided by current age.

[8] Source; Return Rates: Corrections Releases Table from How Recidivism is Measured in Maryland.

[9] Other variables that differed among the treatment and comparison group were included in the model but were not statistically significant, thus were dropped.

[10] The length of the participant's criminal career was a significant factor, however, when diagnostic tests were run, this measure rendered the model biased. For this reason, length of criminal career was omitted from the outcome analysis,

(For example, a 38 year old with 21 prior arrests would have a ratio score of .55, while a 22 year old with 12 prior arrests would have a calculated ratio of .54). This variable was based on a prison intake risk assessment conducted by DPSCS.

The first column of Table 5 provides the results for participation in PSC on post-release arrest. These results indicate that those who are older have a significantly lower probability of arrest, while those with a higher ratio score were significantly more likely to be arrested than those with a lower ratio score. The number of prior incarceration episodes is not significant. Overall, after controlling for key factors, the probability of arrest for those who participate in PSC is 26% compared to the probability of arrest of 42% for those in the comparison group, a difference of 16%.[11]

Participation in PSC also significantly reduces the probability of conviction. As indicated in the second column of Table 5, the probability of reconviction is reduced by 10% among PSC participants.[11] Age remains a relevant factor, while the number of prior of times previously incarcerated is now significant, with those with greater number of prior incarcerations being more likely to be reconvicted. The calculated previous arrest and age ratio is no longer significant. The overall probability of conviction for those who participate in PSC is 11% compared to the probability of conviction of 21% for those in the comparison group; a difference of 10%.[11]

There was also a significant impact of PSC on post-release reincarceration (Column 3 of Table 5). Those in the treatment group were less likely to return to a period of incarceration (defined as 1 or more days), compared to those who did not participate in PSC. Total number of prior times incarcerated again was a significant factor, with those with greater number of prior incarcerations being more likely to be incarcerated post-release. The overall probability of reincarceration for those who participate in PSC is 6% compared to the probability of reincarceration of 16% for those in the comparison group; a difference of 10%.[11] Overall, those who participate in PSC are significantly less likely to be arrested, arrested for a charge leading to a conviction, or arrested for a charge resulting in a return to incarceration in the 12 months following release. The next step is to examine recidivism based on time to failure.

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and the ratio of number of arrests and age and number of prior times incarcerated for more than one day was substituted to account for the participant's criminal history.

[11] Probabilities were calculated based on output values (calculation worksheets are provided in Appendix C).

Table 5: Logistic Regression: 12 Month Post-Release Recidivism N=336

	Logistic Odds Ratios[#] and z Statistic		
	(1)	**(2)**	**(3)**
	Arrest	**Conviction**	**Sentence to Incarceration**
Treatment - PSC	0.496	0.453	0.358
	(2.82)**	(2.47)*	(2.69)**
Age of Participant	0.958	0.951	0.951
	(2.28)*	(2.09)*	(1.82)
Ratio of Age and No. Prior Arrests	3.842	2.262	1.906
	(2.99)**	(1.60)	(1.10)
Total No. Times Prior Incarcerated[L]	1.055	1.128	1.142
	(1.22)	(2.31)*	(2.31)*
Observations (N)	336	336	336
Pseudo R-Square	.0644	.0613	.0682
Log Likelihood	-204.89	-146.55	-119.76

[L] Lifetime measure based on criminal history

*Significant at p<.05 ** Significant at p<.01

[#]Odds Ratios with values above 1 indicate a positive association (or higher odds of the outcome occurring), values below 1 indicate a negative association (or lower odds of the outcome occurring).

Results: Cox Regression (Survival Analysis) – Treatment vs. Comparison

The next analysis was to investigate if there was a difference in the two groups, accounting for time to arrest. CJIS data provides the offender's history including all dates of arrest, the outcome of that arrest, and sentencing data. The period between the date of release and the date of the first arrest was calculated to create a "days to event", which was the outcome measure. The same process was used to identify the days to the first arrest that lead to a conviction post-release, and the days to the first arrest that lead to a sentence of incarceration for one or more days post-release.

The first column of Table 6[12] reveals that those in the PSC treatment group had a lower hazard (or risk) of re-arrest than those in the comparison group. The estimated hazard ratio was .70, indicating

[12] Due to the significant differences in time to release between the treatment and the comparison groups, several additional analyses were conducted to assess the robustness of these survival findings. First, the time to event data were censored so that only those events up to the first year and two years were examined in the Cox Regression model. Then only those cases who had at least 6 months follow-up data n=399 (after conducting propensity matching for this sample, resulted in 192 treatment cases and 207 control cases); and then the survival analysis was conducted using the sample of those with 12 months of follow-up data (N=336). All results were substantively the same.

that those in the treatment group had 30% lower risk[13] compared to those in the comparison group – ranging from as large as a 47% reduction in risk to as small as 6%. This was the case even after controlling for all the factors in the model discussed in Table 5. PSC participation also significantly reduces the risk of having an arrest leading to conviction by 57% (ranging from 72% to 33%), as indicated in the second column of Table 6. Likewise, Column 3 indicates that those who participate in PSC are significantly have a reduced risk of 66% for an arrest that leads to being reincarcerated – (ranging to a reduction in risk of 80% to 43%) compared to the control group.

Table 6: Survival Analysis PSC Participation on Time to Failure N=472

	Cox Regression Coefficient and z Statistic		
	(1) Time to First Arrest	**(2) Time to First Arrest Leading to Conviction**	**(3) Time to First Arrest Leading to Sentence of Incarceration**
Treatment - PSC	-0.350	-0.849	-1.082
	(2.41)*	(3.75)**	(4.01)**
Age of Participant	-0.031	-0.045	-0.045
	(3.03)**	(3.07)**	(2.72)**
Ratio of Age and No. Prior Arrests	0.700	0.402	0.330
	(2.94)**	(1.14)	(0.82)
Total No. Times Prior Incarcerated[L]	0.052	0.077	0.090
	(2.56)*	(2.66)**	(2.79)**
Observations (N)	472	472	472
Log Likelihood	-1194.79	-625.91	-489.53

[L] Lifetime measure based on criminal history

*Significant at p<.05 **Significant at p<.01

PSC participants also had a statistically significant (p<.05) longer period of time before their first post-release arrest than those in the comparison group. They also survived in the community longer than the comparison group before their first arrest leading to a conviction (p<.01) and before their first arrest leading to incarceration (p<.000).

The difference between the treatment and comparison groups on these recidivism outcomes are also illustrated in the survival plots provided in Figure 1, 2 and 3 and in Table 7 below. On the vertical axis is the cumulative survival rate, or the overall rate of those who have survived – or not re-arrested. These graphs were calculated including the variables contained in the Cox regression model in Table 6.

[13] Calculation worksheets for conversation of hazard rate into relative risk are provided in Appendix D. Range of risk is calculated by 1 minus the confidence interval values.

At 365 days post release, 71% of the PSC participants survived in the community without being arrested, with 102 individuals remaining to include in the calculation of the recidivism rate. In contrast, 60% of the comparison group survived, with 127 individuals remaining to be considered in the analysis. As evidenced in Figure 1, the gap between the treatment and control group begins to widen around 300 days (10 months), and the treatment group continues to survive at higher rates than the comparison group until after approximately 600 days (1 year, 8 months).

Up through the first year, it is clear that cases were dropped from the calculated recidivism rate because they failed (or recidivated). However, as time passes, the number of individuals in the treatment group included in the analysis becomes small because they have not been out in the community for as long as the comparison group. For example, only 22 PSC participants are still at risk for arrest at 730 days (2 years) from release, compared to 87 control group members. Thus, caution should be exercised in overstating these results.

Figure 1: Survival Plot: Days to First Arrest N=472

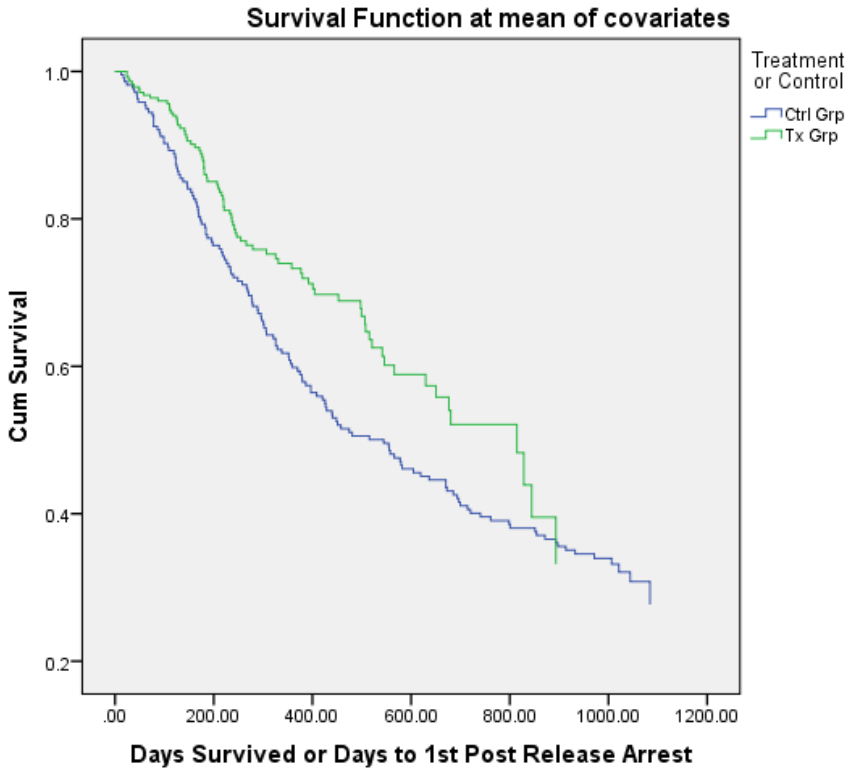
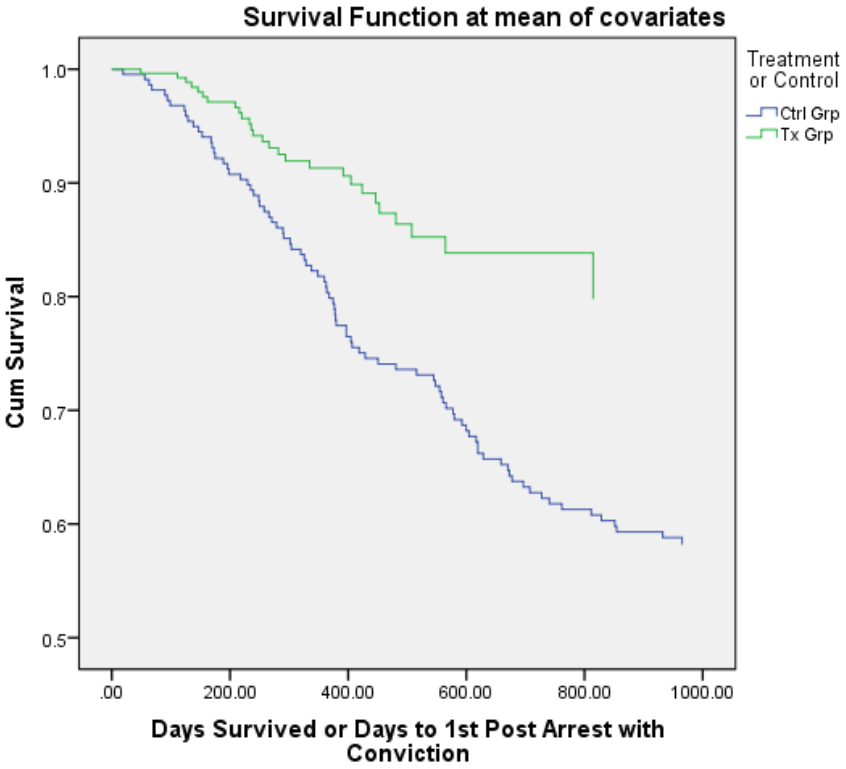


Figure 2 explores survival to the first arrest leading to a conviction. Here again, the treatment group fared better than the comparison group. At 365 days (1 year) post release, 90% of the PSC participants survived in the community without being arrested for a charge that lead to a conviction, with 125 individuals remaining to include in the calculation of the recidivism rate. For the comparison group, 80% survived, with 169 individuals remaining to be considered in the analysis.

The gap between the treatment and comparison group widens further around 300 days (10 months), and the treatment group continues to survive at higher rates than the comparison group until about

500 days (approximately 16 months). At that juncture, 85% of PSC participants survive, with 73 remaining were in the analysis; in contrast, 73% of the comparison group survived, with 155 comparison group members remaining.

Figure 2: Survival Plot: Days to First Arrest Leading to Conviction N=472



Finally, the treatment group survives at a higher rate than the comparison group with respect to the length of time to experiencing an arrest that leads to being incarcerated post-release. At 365 days (1 year), 94% of the treatment group had not been arrested for a charge that resulted in incarceration post-release (with 132 PSC participants remaining in the analysis); compared to 84% of the control group (with 178 remaining).

Figure 3: Survival Plot: Days to First Arrest Leading to Incarceration N=472

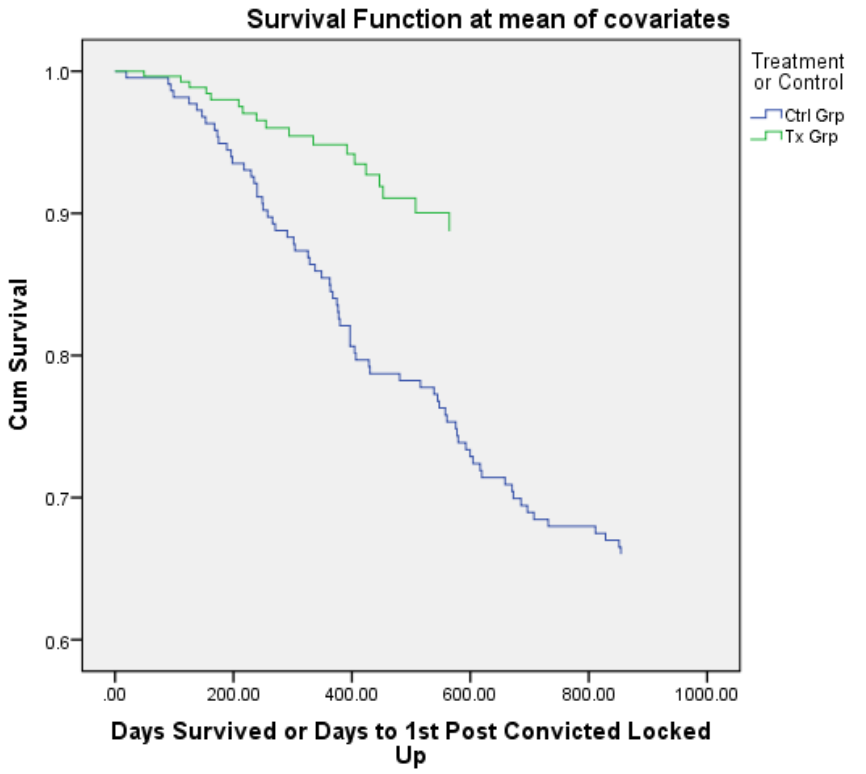


Table 7: Survival at 1 year – PSC Participants vs. Comparison Group N=472

	% Survived - Treatment	% Survived – Comparison
Arrest	71%	60%
Conviction	90%	80%
Sentence to 1 or More Days Incarceration	94%	84%

Limitations

This evaluation has several limitations. First, the analysis does not account for time that the individual may not have been "at risk" due to a post-release incarceration. While the CJIS criminal history data provides whether an individual has been re-arrested, and reconvicted, as well as sentencing information indicating if an individual was sentenced to confinement, the data contains neither dates of release nor dates of incarceration.

A related issue with these data pertains to violations of parole or probation. It is not entirely clear how CJIS data captures the events for an individual on parole who is charged with a new arrest, and returns to prison on a violation of parole triggered by that new arrest, rather than on the new charge.

Another limitation is that the CJIS data does not appear to contain any event past January 11, 2013. Thus those in the sample who were released in summer and fall of 2012 did not have as long of a time to "fail" as those released in prior periods. While we limited the logistic regression to the first year post release, and utilized survival analysis to control for varying times to arrest, this limitation remains.

Conclusions

In summary, one year post-release, participation in PSC has an impact by reducing the probability of arrest by 16%; the probability of an arrest leading to a conviction post-release by 10% and the probability of an arrest leading to a post-release return to incarceration of 10%. In addition, survival analysis reveals that those who participate in PSC survive for a significantly longer period of time before a post-release arrest event, compared to those in the comparison group.

Overall, these results are very promising. In the companion report, outcomes for those in the treatment group are explored more fully, including contextualizing their PSC experience by data obtained during the intake interview with the PSC vendors before release. Those that graduated from PSC are compared to those who are revoked and information include family factors (e.g., marital status and children), and other relevant factors such as drug history and employment outcomes are explored.

Appendix A: Comparison Group Demographics and Criminal History Descriptives

The 211 parolees selected into the comparison group by propensity score were on average 40 years old, (ranging from 22 to 59), the majority are male (92%), African American/Hispanic (94%) and Caucasian (6%).

Table 8: Comparison Group Demographic Descriptives N=211

	N	Freq.	Percent	Range	Mean (SD)
Age (as of June 14, 2013)	211			22 to 59	40.17 (8.5)
Gender – Male			92%	0 to 1	.92 (.27)
Race					
African American/Hispanic		199	94%		
White		12	6%		

Table 9 provides the same measures of criminal history as the PSC Participant group. As of the last event in the CJIS data, January 11, 2013, those in the comparison group had been released on average 34 months, ranging from 30 to 36.7 months; (in days, they averaged 1020 days since release).

Among the comparison group, the most common type of offender, based on the most serious conviction over their criminal career, is a person offender (65%), followed by drug (33%), sex offender (2%) and property (<1%). The length of criminal career was based on the first date of arrest recorded in CJIS, and spanned a range from 126 days to over 34 years and on average, those in the comparison group had been criminally involved over 17 years.

Those in the comparison group had an average of 16 arrests (ranging from 1 to 54), 8 prior convictions and an average conviction rate of 52% overall. Among those convictions, approximately 38% were for felony level offenses and the maximum seriousness category averaged 4.11 – a Level IV offense within a range of Level I to Level VII. Level IV offenses include arson, manufacture and/or distribution of controlled dangerous substances, second and third degree burglary, escape from confinement, and robbery.

Table 9 also provides arrest information broken down to provide charge data. Those in the comparison group had an average of 36 charges (ranging from 3 to 102 charges) in their criminal career, with 12 charges resulting in a conviction (ranging from 1 to 37 charges convicted), thus 31% of all charges resulted in a conviction. Among these charges, 29% were for felony level offenses, and the most serious charge category averaged 3.39, which is a level V offense. Level V offenses include charges such as second degree assault; false statement to law enforcement officer; uttering false document; theft over $500; motor vehicle theft; possession of controlled dangerous substances (not marijuana); third degree sexual offense; weapons – illegal possession by convicted felon; and obstructing & hindering.

A breakdown by different types of offenses includes both the number of charges overall, within a range, and the number of those charges that lead to a conviction. Note that the offenses listed include person crimes (including weapons charges) and sex crimes (including prostitution). Weapons and prostitution are provided separately.

The final section of Table 9 is incarceration history, defined as sentenced to one or more days. On average, those in the comparison group had experienced from 1 to 24 periods of incarceration, on average serving close to 6 times. The total time imposed over the course of their career ranges from 1 day to 106 years, with an average time imposed of 17.4 years. The average sentence per incarceration period is 163 days, but ranges up to 5.9 years.

Table 9: Comparison Group Criminal History Descriptives N=211

	N	Freq.	Percent	Range	Mean (SD)
DPSCS Risk Data					
Age at First Involvement with Crime	211			6 to 49	18.65 (4.64)
Number of Juvenile and Adult Arrests	211			1 to 65	18.92 (10.26)
Ratio: Number Prior Arrests/Current Age	211			0 to 1.61	.52 (.26)
CJIS Data					
Time Since Release	211				
Months Since Release				30 to 36.7	34.0 (1.67)
Days Since Release				925 to 1101	1020 (50)
Offender Class (Serious Conviction)	211				
Person		136	65%		
Sex		4	2%		
Drug		70	33%		
Property		1	<1%		
Criminal Career	211				
Length of Career (in months)				4 to 411	213 (100)
Length of Career (in days)				126 to 12492	6492 (3050)
Arrest, Charge, and Conviction History					
Total Number of Prior Arrests	211			1 to 54	16.18(9.38)
Total Number Prior Convictions - Arrest	211			1 to 30	7.91 (4.49)
Prior Arrest Conviction Rate	211			.10 to 1	.52 (.16)
Proportion of Prior Felony Convictions	211			0 to 1	.38 (.23)
Most Serious Category – Convictions	211			1 to 7	4.11 (.64)
Total Number of Prior Charges	211			3 to 102	36.33 (19.52)
Total Number Prior Convictions - Charges	211			1 to 37	11.82 (6.43)
Average Charges Per Prior Arrest	211			1 to 17.33	2.56 (1.77)
Prior Charges Conviction Rate	211			.02 to .73	.31 (.13)
Proportion of Prior Felony Charges	211			0 to .70	.29 (.12)
Most Serious Category - Charges	211			1 to 6	3.39 (1.17)

	N	Freq.	Percent	Range	Mean (SD)
Charge & Conviction History By Type of Offense					
Person Offenses (Including Weapons)					
Total Number of Charges	188			1 to 51	10.53(9.91)
Total Number of Convictions	188			0 to 10	1.73 (1.84)
Weapons Only Offenses					
Total Number of Charges	129			1 to 21	3.75 (3.39)
Total Number of Convictions	129			0 to 3	.53 (.69)
Sexual Offenses (Including Prostitution)					
Total Number of Charges	23			1 to 5	2.00 (1.08)
Total Number of Convictions	23			0 to 4	.57 (.99)
Prostitution Only Offenses					
Total Number of Charges	9			1 to 4	1.56 (1.01)
Total Number of Convictions	9			0 to 3	1.00 (1.00)
Drug Offenses					
Total Number of Charges	206			1 to 89	21.34 (12.99)
Total Number of Convictions	206			0 to 17	5.53 (3.39)
Property Offenses					
Total Number of Charges	194			1 to 61	9.53 (10.80)
Total Number of Convictions	194			0 to 28	2.28 (3.44)
Traffic Offenses					
Total Number of Charges	52			1 to 8	1.96 (1.42)
Total Number of Convictions	52			0 to 3	.37 (.71)
Total "Other" Charges					
Total Number of Charges	57			1 to 11	1.89 (1.80)
Total Number of Convictions	57			0 to 2	.39 (.56)
Total Violation Probation/Parole					
Total Number of Charges	176			1 to 13	3.45 (2.34)
Total Number of Convictions	176			0 to 12	2.74 (1.89)
Incarceration History					
Prior Times Incarcerated	260			1 to 24	5.86 (3.8)
Total Time Imposed (in days)	260			1 to 38865	6367(5815)
Average Incarceration Sentence (in days)	260			1 to 2159	163 (232)

Appendix B: Propensity Matching Technical Report

Random assignment to the treatment condition is considered the scientific "gold standard". This is because when individuals are assigned to treatment by chance, it can be assumed that variations between those in the comparison and the treatment groups are random and should not influence or bias the outcomes of the study.

In many instances, random assignment is not feasible, so it is possible that those participating in a program that selected (or self-selected) into the treatment condition were substantially different than those who would be randomly assigned to treatment. One way to overcome this selection bias is to create a comparison group by calculating a propensity score using logistic regression to estimate the probability that, had this intervention employed random assignment, the individual would have been assigned to the treatment group.[14]

Three sources of data were utilized to create the propensity score, all provided by DPSCS. DPSCS provided demographic information, risk assessment data obtained from individuals during their prison and/or probation intake interviews, and summated variables from the standard Criminal Justice Information System (CJIS) criminal history. The objective of this analysis is to obtain "covariate balance … [where] the observed covariates x and the treatment Z are *conditionally independent* within the matched sets" of individuals.[15]

The selection of the variables to be included in the propensity score calculation were more of a "kitchen sink" approach where all theoretically relevant factors believed to influence either someone's participation in the treatment and/or the outcome of a post-release arrest, were included in the model. In this case, virtually every variable available was considered.

Using StataSE 13, logistic regression was conducted and subsequently, several variables originally considered were dropped from the model because it was not possible to "balance" the treatment and comparison groups when these variables where included (e.g., gender and days from release were dropped). The final set of variables that were included in the propensity score for the final[16] comparison group are listed in Table 10.

[14] Rosenbuam, P.R., & D.B. Rubin (1985). Constructing a Control Group Using Multivariate Matched Sampling Methods that Incorporate the Propensity Score. The American Statistician, 39, (1), 33-38.

[15] Loughran, T. (2007). Causal Inference Using Propensity Scores. Presentation at the American Society of Criminology Workshop, November 13, 2007.

[16] The first propensity score and matching process was conducted to create a smaller group of matched individuals from the 1,142 individuals paroled from January to June 2010 so that DPSCS staff could determine if these parolees would be returning to Baltimore City. The first propensity score included gender, and did not contain the variables of actualmean, pimp, N_arrests, sercat_last, convservcat_mean.

Table 10: Variables Used to Calculate Propensity Score

Variable Name	Explanation
Age	Age of individual as of June 14, 2013
Nonwhite	Race/Ethnicity White=0; Non-White=1
Drugoff	Most serious prior conviction was a drug offense
Careerdays	Length of criminal career, in days
rfirstarr_first	Age at first arrest (self-reported assessment risk tool)
rratio_first	Ratio of current age and number of prior arrests (risk tool)
N_arrests	Arrests Prior Career Total
arrconvrate	Prior Arrest Conviction Rate
N_totalchgs	Total Prior Charges
N_chgconv	Total Convicted Charges
misfel_mean	Prior Average Felony Charges
convmisfel_mean	Prior Average Felony Convictions
Sercat_last	Prior Least Serious Offense Category
convsercat_mean	Average Serious Category, Prior Convictions
Person_sum	Prior Total Person Charges
Convperson_sum	Prior Total Person Convictions
Sex_sum	Prior Total Sex Charges
Convsex_sum	Prior Total Sex Convictions
property_sum	Prior Total Property Charges
convproperty_sum	Prior Total Property Convictions
weapon_sum	Prior Total Weapons Charges
convweapon_sum	Prior Total Weapons Convictions
vop_sum	Prior Total VOP Charges
convvop_sum	Prior Total VOP Convictions
incarcer_sum	Total Times Incarcerated 1 or more Days
Actualmean	Average number of days sentenced to incarceration
Pimp	Number of days sentenced to probation

Once the propensity score was calculated, the comparison group was matched to the treatment sample by requesting two comparison cases who were the "nearest neighbor" to the treatment case based on the propensity score.[17] In this process, 9 cases that could not be matched were dropped from the final sample. The result was a sample of 211 in the comparison, matched to 261 in the treatment group.

See Figure 4 for a graphical display (box plots) of the area of common support (e.g., the overlap) between the two groups. It is important to note that prior to conducting the propensity score matching, statistical tests were conducted to compare the groups. In virtually all realms, (except age

[17] To create the initial sample for review by DPSCS, the nearest neighbor with two comparison cases for every treatment case matching process resulted in an a sample of 255 control cases. We anticipated that only 60% of those would be returning to Baltimore City. As a precaution, a second weighted stratified matching strategy was conducted to obtain additional comparison cases. This netted an additional 100 cases, for a total of 355. Once DPSCS identified Baltimore City returnees, there were 219 individuals in the comparison pool. The propensity score was recalculated and the groups were re-matched, resulting in the final sample of 211 comparison cases.

and a few of the summated CJIS criminal history variables) those who participated in PSC, compared to the comparison group pool, differed significantly. Specifically, those in the treatment group were generally more serious offenders overall with a higher number of prior arrests, convictions, charges, and longer criminal careers. There were also differences in demographic variables including gender and race.

It is important also to remember is that the propensity score is *not* matching each of the different variables one by one within the comparison group to the treatment cases. What the propensity score does is calculate an *overall* score that allows these different factors to play a role in context with the other attributes. While using this statistical method made it possible to create a well matched comparison group, it is important to note that this is matched on *observed* characteristics of these individuals (e.g., age, criminal history, etc). There could be additional *unobserved* factors that we cannot account for in this process that also likely influence the outcomes of recidivism. We attempt to address this limitation by including as many variables as possible in the model, but this limitation remains. Nonetheless, the rigor of the propensity score method, if used appropriately, has advanced the ability of social scientists who work primarily in a non-laboratory setting, to assess and evaluate treatment using these matching techniques.

Figure 4: Box Plots of Matched Comparison & Treatment Groups, All Cases N=472

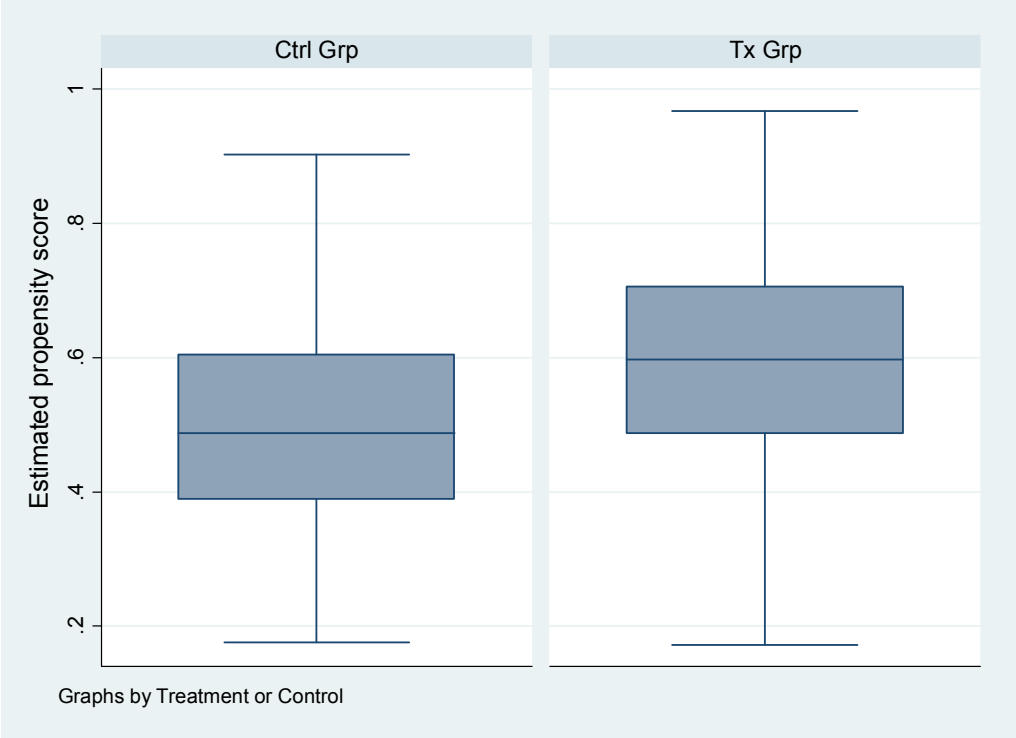


Figure 5 includes the output table reflecting each variable in the propensity score calculation, coefficients, standard errors, and t values.

Figure 5: Propensity Score Variable Coefficients, Standard Errors and t-values N=472

```
The treatment is tx

  Treatment |
 or Control |      Freq.     Percent        Cum.
------------+-----------------------------------
   Ctrl Grp |        211       44.70       44.70
     Tx Grp |        261       55.30      100.00
------------+-----------------------------------
      Total |        472      100.00


Estimation of the propensity score

Iteration 0:   log likelihood = -324.51219
Iteration 1:   log likelihood =  -300.4213
Iteration 2:   log likelihood = -300.13403
Iteration 3:   log likelihood =  -300.1338

Probit regression                                 Number of obs   =        472
                                                  LR chi2(27)     =      48.76
                                                  Prob > chi2     =     0.0063
Log likelihood =  -300.1338                       Pseudo R2       =     0.0751

------------------------------------------------------------------------------
          tx |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  actualmean |  -.0001357   .0003742    -0.36   0.717     -.000869    .0005977
        pimp |   .0000247   .0000371     0.67   0.506     -.000048    .0000975
   N_arrests |   .0140546   .0219679     0.64   0.522    -.0290016    .0571109
 sercat_last |  -.0940564   .0816283    -1.15   0.249    -.2540449    .0659321
convserca~an |   .4867575   .2171694     2.24   0.025     .0611134    .9124016
         age |   .0259685   .0162605     1.60   0.110    -.0059016    .0578386
    nonwhite |   -.489777   .2647738    -1.85   0.064    -1.008724      .02917
  careerdays |  -.0001699   .0000455    -3.74   0.000     -.000259   -.0000808
     drugoff |   .0558128   .1649923     0.34   0.735    -.2675662    .3791917
rfirstarr_~t |  -.0273546   .0161222    -1.70   0.090    -.0589536    .0042443
rratio_first |  -.2995967    .300568    -1.00   0.319    -.8886991    .2895058
 arrconvrate |  -.7642207   .6204114    -1.23   0.218    -1.980205    .4517634
 N_totalchgs |  -.0032944   .0087981    -0.37   0.708    -.0205384    .0139497
   N_chgconv |   .0180649   .0357266     0.51   0.613    -.0519578    .0880877
  person_sum |   .0100184    .013814     0.73   0.468    -.0170566    .0370934
convperson~m |   -.019336   .0579828    -0.33   0.739    -.1329803    .0943082
     sex_sum |  -.0464065   .1166154    -0.40   0.691    -.2749685    .1821555
 convsex_sum |    -.05042    .259059    -0.19   0.846    -.5581663    .4573263
property_sum |   .0110839   .0129537     0.86   0.392     -.014305    .0364727
convproper~m |   -.045082   .0398671    -1.13   0.258    -.1232202    .0330562
  weapon_sum |   .0026393    .032543     0.08   0.935    -.0611439    .0664224
convweapon~m |  -.1328014   .1328324    -1.00   0.317    -.3931482    .1275453
     vop_sum |  -.0804114   .0600856    -1.34   0.181    -.1981771    .0373543
 convvop_sum |   .0766427   .0769381     1.00   0.319    -.0741533    .2274387
incarcer_sum |   .0725849   .0430459     1.69   0.092    -.0117835    .1569532
 misfel_mean |  -.6944704   .7847374    -0.88   0.376    -2.232527    .8435867
convmisfel~n |  -.7741553   .6534705    -1.18   0.236    -2.054934    .5066234
       _cons |   .1873477   .7594987     0.25   0.805    -1.301242    1.675938
------------------------------------------------------------------------------
```

As noted in the Research Design discussion in addition to matching the full sample, a sub-sample of treatment cases were selected for the logistic regression analysis in order to observe the impact of treatment for a 12 month period following release. This analysis excluded anyone who did not have at least 12 months of follow-up data, and consequently, 118 treatment cases were dropped.[18] As this was a loss of 45% of the treatment sample, the propensity score matching process was repeated using the same variables used to select the comparison group for the full sample. This process eliminated 18 control cases.[19] The final sample available to conduct the logistic regression was 336 cases -- 143 treatment and 193 control cases.

Figure 6 provides the graphical display (box plots) of the area of common support (e.g., the overlap) between the treatment and comparison group.

Figure 6: Box Plots of Matched Comparison & Treatment Groups One Year Follow-Up N=336

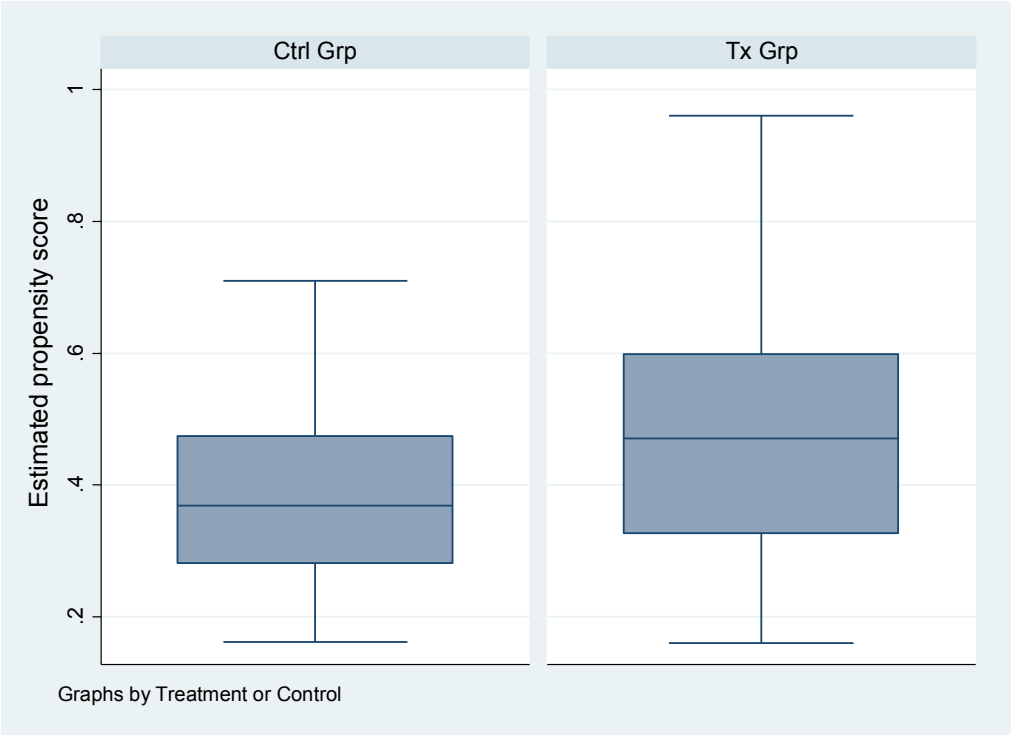


Figure 7 provides the propensity score regression output derived in this matching process.

[18] Differences explored between those in the treatment group retained vs. those dropped on all criminal history and demographic data revealed only two significant variables. Those dropped had a higher maximum seriousness conviction category score of 4.36 (compared to those retained with a score of 4.18) and cases dropped were more likely to be non-white (94% were non-white in the dropped treatment cases vs. 87% of those retained).

[19] An analysis of the mean differences between those retained in the control group revealed that the 18 comparison cases dropped from the sub-sample analysis were generally less serious offenders than those retained in the sample. Specifically, they had significantly fewer prior charges resulting in a conviction; were sentenced to fewer days overall; had a lower ratio of prior charges to current age score; had fewer drug charges and fewer VOP convictions. They were also older (average age of 44.3 for control cases dropped versus 39.7 years old for those retained); they were more likely to be non-white (100% were non-white in the dropped comparison cases vs. 94% of those retained); and had experienced their first arrest at an older age than those retained in the sample (21.7 vs. 18.37, respectively).

Figure 7: Propensity Score Variable Coefficients, Standard Errors and t-values N=354

```
The treatment is tx

  Treatment |
 or Control |      Freq.     Percent        Cum.
------------+-----------------------------------
   Ctrl Grp |        211       59.60       59.60
     Tx Grp |        143       40.40      100.00
------------+-----------------------------------
      Total |        354      100.00


Estimation of the propensity score

Iteration 0:   log likelihood = -238.80226
Iteration 1:   log likelihood = -219.13343
Iteration 2:   log likelihood = -218.83718
Iteration 3:   log likelihood = -218.83681

Probit regression                                 Number of obs   =        354
                                                  LR chi2(26)     =      39.93
                                                  Prob > chi2     =     0.0396
Log likelihood = -218.83681                       Pseudo R2       =     0.0836

------------------------------------------------------------------------------
          tx |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  actualmean |  -.0001624   .0004311    -0.38   0.706    -.0010073    .0006826
        pimp |   .0000357    .000044     0.81   0.417    -.0000506    .0001219
   N_arrests |   .0022892   .0253403     0.09   0.928    -.0473768    .0519553
convserca~an |   .5461631   .2627786     2.08   0.038     .0311266      1.0612
         age |    .021032   .0197091     1.07   0.286    -.0175971    .0596611
    nonwhite |  -.7309083   .2906036    -2.52   0.012    -1.300481   -.1613357
  careerdays |  -.0001185   .0000547    -2.17   0.030    -.0002258   -.0000112
     drugoff |   .0319876   .1915645     0.17   0.867    -.3434719    .4074472
rfirstarr_~t |  -.0302743   .0193959    -1.56   0.119    -.0682896    .0077409
rratio_first |   .2039243   .3387563     0.60   0.547    -.4600259    .8678745
 arrconvrate |  -.7678993   .7430044    -1.03   0.301    -2.224161    .6883625
 N_totalchgs |  -.0032399   .0100638    -0.32   0.748    -.0229646    .0164848
   N_chgconv |   .0162635   .0434723     0.37   0.708    -.0689406    .1014676
  person_sum |   .0102009   .0161948     0.63   0.529    -.0215403     .041942
convperson~m |  -.0464599   .0690718    -0.67   0.501    -.1818381    .0889184
     sex_sum |  -.0805902   .1457755    -0.55   0.580    -.3663049    .2051245
 convsex_sum |  -.3026665    .324932    -0.93   0.352    -.9395214    .3341885
property_sum |   .0152625    .015156     1.01   0.314    -.0144427    .0449676
convproper~m |  -.0706142   .0479883    -1.47   0.141    -.1646694     .023441
  weapon_sum |   -.026399   .0386003    -0.68   0.494    -.1020542    .0492563
convweapon~m |  -.1303474    .160035    -0.81   0.415    -.4440101    .1833154
     vop_sum |   -.085035   .0688328    -1.24   0.217    -.2199449    .0498748
 convvop_sum |   .0938686     .09117     1.03   0.303    -.0848212    .2725585
incarcer_sum |   .0774532   .0518277     1.49   0.135    -.0241271    .1790336
 misfel_mean |  -.6254158   .9259552    -0.68   0.499    -2.440255    1.189423
convmisfel~n |  -.9523023   .7943852    -1.20   0.231    -2.509269     .604664
       _cons |  -.2779356   .8780634    -0.32   0.752    -1.998908    1.443037
------------------------------------------------------------------------------
```

Appendix C: Conversion of Odds Ratio to Probability Worksheet

Arrest	**Odds Ratio**	**Reduction In Odds**	**Change from 0 (CTRL) to 1 (TX)**	**Change into %**	
TX - PSC	0.496	-50%	-0.155	-16%	The probability that those who participate in PSC will be arrested is reduced by 16%.
Age	0.958	-4%	-0.008	-1%	
Ratio: Prior Arrest/Age	3.842	284%	0.290	29%	
No. Prior Incarcerations	1.055	5%	0.011	1%	

Probability of Arrest – Treatment Group vs. Comparison Group for full model[20]

Treatment Group	26%
Comparison Group	42%

Conviction	**Odds Ratio**	**Reduction In Odds**	**Change from 0 (CTRL) to 1 (TX)**	**Change into %**	
TX - PSC	0.453	-55%	-0.102	-10%	The probability of those who participate in PSC are reconvicted is reduced by 10%.
Age	0.951	-5%	-0.012	-1%	
Ratio: Prior Arrest/Age	2.262	126%	0.106	11%	
No. Prior Incarcerations	1.128	13%	0.009	1%	

Probability of Conviction– Treatment Group vs. Comparison Group for full model[20]

Treatment Group	11%
Comparison Group	21%

[20] Calculated by running the regression model separately by restricting it to only those cases that participated in PSC and then for those in the comparison group who did not participate in PSC.

Incarceration	**Odds Ratio**	**Reduction In Odds**	**Change from 0 (CTRL) to 1 (TX)**	**Change into %**	
TX - PSC	0.358	-64%	-0.096	-10%	The probability of those who participate in PSC are reincarcerated is reduced by 10%.
Age	0.951	-5%	-0.013	-1%	
Ratio: Prior Arrest/Age	1.906	91%	0.062	6%	
No. Prior Incarcerations	1.142	14%	0.007	1%	

Probability of Reincarceration – Treatment Group vs. Comparison Group for full model[20]

Treatment Group	6%
Comparison Group	16%

Appendix D: Conversion of Hazard Rates to Relative Risk Worksheet

Arrest	**Exp(B) Hazard Rate**	**Relative Risk**	**95% Confidence Interval**	
TX - PSC	.705	0.30	.529 to .936	The risk of arrest for those who participated in PSC is reduced by 30% compared to the matched comparison group, with all other values held constant.
Age	.969	0.03		
Ratio: Prior Arrest/Age	2.015	-1.01		
No. Prior Incarcerations	1.054	-0.05		

Conviction	**Exp(B) Hazard Rate**	**Relative Risk**	**95% Confidence Interval**	
TX - PSC	.428	0.57	.274 to .667	The risk of conviction for those who participated in PSC is reduced by 57% compared to the matched comparison group, with all other values held constant.
Age	.956	0.04		
Ratio: Prior Arrest/Age	1.495	-.50		
No. Prior Incarcerations	1.079	-0.08		

Incarceration	**Exp(B) Hazard Rate**	**Relative Risk**	**95% Confidence Interval**	
TX - PSC	.339	0.66	.199 to .575	The risk of reincarceration for those who participated in PSC is reduced by 66% compared to the matched comparison group, with all other values held constant.
Age	.956	0.04		
Ratio: Prior Arrest/Age	1.391	-.39		
No. Prior Incarcerations	1.095	-0.09		