

## Recidivism by Direct Sentence Clients Released from Day Report Centers in 2011: Predictors and Patterns over Time

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Recidivism is an increasingly salient issue for policy-makers as prison populations continue to grow and correctional facilities become more crowded. According to the most recent national recidivism report from the Bureau of Justice Statistics, nearly 70% of state prison inmates are rearrested and more than 50% are reincarcerated within 3 years of release (Durose, Cooper, & Snyder, 2014). For this reason, many states have identified recidivism reduction as an important goal for criminal justice policy.

Day report centers (DRCs) play a significant role in efforts to reduce recidivism and rehabilitate offenders. DRCs are community corrections facilities which offer an alternative to incarceration in prisons or jails. Offenders who are sentenced to participate in a DRC program are required to report to the facility during the day, where they are supervised and receive services, but they are typically permitted to leave the facility in order to go to work or attend school, and can return to their own homes in the evening. DRCs have the potential to significantly reduce recidivism because programs are expected to provide offenders with intensive rehabilitative treatment (e.g., cognitive-behavioral therapy, mental health counseling, substance abuse treatment, remedial education). They also provide these services in a community-based setting that enables offenders to retain employment and maintain relationships with their families and other sources of social support.

In West Virginia, there are currently 26 operational DRC programs serving a population of approximately 4,000 clients in 45 counties. Although these facilities are used for a variety of purposes, the majority of clients are convicted offenders who pose a significant risk of

### *Report Highlights...*

This study investigates the factors that predict the likelihood that DRC clients will be arrested, booked into jail, or incarcerated within 2 years of release.

It also examines the timing of recidivism events during the period after release.

The strong relationship between successful program completion, risk scores, and recidivism provides evidence of the impact of DRC programming and the predictive validity of the LS/CMI risk assessment tool.

Analysis of LS/CMI subcomponent scores reveals important areas of criminogenic need for the DRC client population in WV, and suggest means for further improving the quality of service delivery in DRCs.

Findings related to the timing of recidivism point to additional opportunities for reducing recidivism rates through the use of targeted post-release supervision strategies.

Implications for quality assurance, effective treatment dosage, and adherence to evidence-based practices are also discussed.

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recidivating. Shortly after admission, all clients are expected to receive a risk and needs assessment that determines the level of recidivism risk for each client and identifies the individual risk factors, or criminogenic needs, that influence the likelihood that they will reoffend. DRCs are then expected to use this information to provide each client with individualized services that are targeted to address their most serious criminogenic needs.

Although DRC programs have the potential to substantially reduce recidivism, evaluation research is still ongoing and has not yet arrived at a consensus in regard to their effectiveness. Some studies observe that offenders who participate in DRC programs have lower rates of recidivism (Champion, Harvey, & Schanz, 2011; Craddock, 2004, 2009; Ostermann, 2009), but others find that there is no statistically significant difference between the recidivism rates of DRC clients and those of other offenders (Boyle, Ragusa-Salerno, Lanterman, & Marcus, 2013; Jones & Lacy, 1999; Marciniak, 2000). In addition, efforts to assess the efficacy of DRCs are often complicated by the fact that individual DRCs have been shown to vary greatly in regard to the characteristics of the offender populations they serve and the quality and integrity of their programming (Barton & Roy, 2005).

However, one area in which literature has produced consistent findings concerns the effects of DRC programming on clients who complete their programs successfully. Here, a number of studies find that clients who complete the DRC program successfully are much less likely to recidivate than those who fail to complete the program (Barton & Roy, 2005; Craddock, 2000, 2004; Rhyne, 2005; Roy & Grimes, 2002). These findings suggest that successful program completion plays a crucial role in determining impact of DRC programming on recidivism.

In a previous report (Spence & Haas, 2014), we investigated the factors that influence the likelihood that offenders who are sentenced to participate in DRCs successfully complete the program. That report also produced some initial analyses which indicate that, consistent with the findings of other studies, clients who complete the program successfully are significantly less likely to recidivate than those who do not. The present study builds on those findings by investigating the impact of successful program completion using multivariate

logistic regression models that control for other likely predictors of recidivism. It also utilizes two additional recidivism measures—arrests and incarcerations—that enable the examination of a broader range of recidivist behavior and that provide additional insights into the extent to which clients released from DRCs continue to have an impact on the state’s correctional resources. The present study also provides analyses that examine the effects of the successful completion of DRC programs on patterns of recidivist behavior over time and for clients with different levels of recidivism risk. Finally, this report also provides an extensive analysis of the predictive validity of the Level of Service/Case Management Inventory (LS/CMI) risk assessment tool. These analyses examine the validity of both the total risk assessment scores and the individual subcomponent scores that address clients’ criminogenic needs in specific areas. Consequently, they provide a number of important findings about the effectiveness of the LS/CMI assessment tool and the most important areas of criminogenic need in regard to the offender population in West Virginia.

It is expected that the results of these analyses will have important implications for DRC administrators and staff as well as state planners and policy-makers. By assessing the efficacy of DRC programs in regard to a variety of recidivism measures, this report will help policy-makers to better understand the impact of DRC programs and highlight the factors that drive recidivism by DRC clients. In addition, the analyses that examine the timing of recidivist behavior are likely to provide important information about the challenges that DRC clients face after release, and may serve to guide policy changes designed to help offenders adjust more easily to life outside the program.

The next section of this report provides a general review of prior recidivism research that identifies a number of factors that are likely to be related to the risk that DRC clients will reoffend. This is followed by a detailed description of the data sources and analytic methods used in this report, and the presentation of the results of the empirical analyses. We conclude the report with a discussion of the policy implications suggested by the findings, and offer several recommendations for enhancing the impact of the state’s DRC programs.

## PREDICTORS OF RECIDIVISM

The literature investigating the predictors of recidivism is vast. Over the past several decades, hundreds of studies have sought to investigate the relationship between recidivism outcomes and a broad array of variables. While most of this research has focused on offenders released from residential correctional facilities such as prisons or jails, studies of recidivism by offenders released from community corrections programs have generally produced findings that are consistent with the broader literature (Ostermann, 2009). Taken together, these findings point to a set of common factors related to recidivism risk.

One of the most consistent findings in the literature is that the risk of recidivism is related to offender age. Research indicates that younger offenders are generally more likely to recidivate than older offenders (Bushway, Piquero, Broidy, Cauffman, & Mazerolle, 2011; Craddock, 2000; Langan & Levin, 2002), with the likelihood of reoffending being greatest for offenders who are in their late teens or early 20s (Bushway, Thornberry, & Krohn, 2003; Sampson & Laub, 2003). There is also evidence that the risk of recidivism gradually decreases as offenders get older and that most offenders eventually “age out” of criminal behavior (Laub & Sampson, 2001; Massoglia & Uggen, 2010). This relationship between age and recidivism, often described as the “age-crime curve” (Blumstein & Nakamura, 2009, p. 331), is usually explained as the result of a maturation process in which aging offenders gradually become involved in more prosocial relationships and institutions, and gain a greater understanding of the consequences of offending (Huebner & Berg, 2011).

In this regard, many studies find that offenders are less likely to recidivate if they secure stable employment (Kim, Hee-Jong, & McCarty, 2008; Uggen, 2000), become married (Huebner & Berg, 2011), or develop stronger relationships with family members who abstain from crime (Sampson & Laub, 2003). These experiences are believed to restrict offenders’ impulses toward criminal behavior and give them something to lose if they become reincarcerated. Conversely, research indicates that the likelihood of reoffending is greater for individuals if they engage in drug use after release (Harrison, 2001) or if they return to live in disadvantaged or high-crime neighborhoods

### *Report Highlights...*

Research studies have identified a number of predictors of recidivism, including an offender’s age, employment status, educational attainment, criminal history, and living situation.

Meta-analyses indicate that certain types of correctional rehabilitation programs and intervention strategies produce sustained reductions in recidivism.

The findings of this research have been summarized into a set of principles of effective correctional intervention. Two of the most important are the risk and need principles.

The risk principle asserts that more services and treatment resources should be provided to individuals with a higher risk of reoffending.

The need principle posits that correctional treatment should be targeted to address offenders’ greatest criminogenic needs.

Studies indicate that correctional programs that adhere to the risk and need principles are more effective at reducing recidivism.

(Visher & Travis, 2003). In a similar vein, studies also show that offenders are more likely to recidivate if they have committed a larger number of prior offenses (Craddock, 2000; Ostermann, 2009) or if they have committed offenses that include felonies or property crimes (Huebner & Berg, 2011). These findings are thought to be indicative of the fact that a more serious criminal record often makes it more difficult for individuals to find adequate housing or employment, or to fully reintegrate into conventional society.

Another important body of findings in the recidivism literature concerns the impact of correctional rehabilitation programs. Here, the results of meta-analyses indicate that certain types of programs and intervention strategies produce sustained reductions in recidivism, and that these effects are consistent across a variety of offender populations, including DRC clients (Dowden & Andrews, 2004). In recent years, these findings have been summarized into a

### *Report Highlights...*

Assessment of offenders' risk and needs is essential to the implementation of the principles of effective intervention.

All WV community supervision agencies employ an actuarial risk assessment tool called the Level of Service/Case Management Inventory (LS/CMI) to assess risk and needs.

Meta-analyses show that the LS/CMI is a consistent, highly accurate predictor of recidivism for a variety of offender populations, including offenders under community supervision.

A large body of research also shows that the LS/CMI has predictive validity across different forms of recidivism, including probation/parole violations, arrests, convictions, and successful program completion.

set of principles for effective correctional interventions, of which the two most important are the risk and need principles (Lowenkamp, Pealer, Smith, & Latessa, 2006).

The risk principle refers to the strategy of providing more services and treatment resources to individuals with a higher risk of reoffending. A large body of research, including 7 meta-analyses of more than 400 primary studies, demonstrates that correctional treatment programs that adhere to the risk principle produce reductions in recidivism that are greater than those of programs that do not adhere (Dowden & Andrews, 1999a, 1999b, 2000, 2003; Hanson, Bourgon, Helmus, & Hodgson, 2009; Lipsey, 2009; Lipsey, Landenberger, & Wilson, 2007). In addition, this research also indicates that treatment which violates the risk principle (i.e., by providing intensive treatment to low risk offenders) may actually result in increases in recidivism (Lowenkamp & Latessa, 2005). This is thought to be because of a contagion effect, whereby intensive treatment places low risk individuals in frequent social contact with high risk offenders. Thus, the risk principle suggests that correctional rehabilitation can have a substantial impact on recidivism, but that its effectiveness is contingent on *who* receives treatment, with high risk offenders

being the individuals who are likely to benefit most.

The need principle asserts that correctional treatment should be targeted to address offenders' greatest criminogenic needs. In this respect, the need principle indicates *what* types of treatment are likely to be the most effective at reducing recidivism. Research has identified certain treatment needs, such as antisocial attitudes, dysfunctional family relationships, or substance abuse problems, that are consistently correlated with criminal behavior (Bonta & Andrews, 2010). Programs that target these needs when providing treatment, and that tailor their treatments to address the individual needs of offenders, consistently produce greater reductions in recidivism (Smith, Cullen, & Latessa, 2009). In contrast, treatments which do not directly address criminogenic needs, such as boot camps or "scared straight" programs, have been shown to have little or no significant impact on recidivism (Latessa, Cullen, & Gendreau, 2002).

### *The Importance of Risk and Needs Assessments*

The successful implementation of the principles of effective intervention depends crucially on obtaining timely measures of offenders' risk and needs. Most correctional rehabilitation programs do this through the use of actuarial risk and need assessment tools. A recent report by the Vera Institute of Justice (2010) observes that 82% of US states have adopted statewide implementation of some form of actuarial assessment tool in their community corrections programs. These tools differ from other types of assessments in that they use statistical algorithms to categorize offenders into subgroups with similar levels of recidivism risk. These algorithms typically take a broad array of factors into account, including offenders' demographic characteristics, criminal histories, and criminogenic needs. Assessment tools therefore provide a means of aggregating many of the recidivism predictors identified by the literature into a single measure of the risk that a given individual will reoffend. Validation research indicates that actuarial assessment tools generally produce results that are more accurate and consistent than those produced by other types of assessments, which often rely heavily on the subjective judgments of evaluators (Kim et al., 2008).

As a part of the governor's statewide implementation initiative, all community supervision agencies in West

Virginia employ an actuarial assessment tool called the Level of Service/Case Management Inventory (LS/CMI) to assess offenders' risk and needs. The LS/CMI has been validated by hundreds of primary studies, the results of which have been synthesized by several meta-analyses. These meta-analyses show that the LS/CMI is a consistent, highly accurate predictor of recidivism for a variety of offender populations, including offenders in community corrections programs (Olver, Stockdale, & Wormith, 2013; Vose, Cullen, & Smith, 2008; Yang, Wong, & Coid, 2010). There is also evidence that the predictive validity of the LS/CMI is robust to offender differences in regard to gender, ethnicity, and age (Olver et al., 2013). Given these findings, one would expect the LS/CMI to be a powerful predictor of the risk that DRC clients will recidivate.

### *The Impact of Treatment Dosage on Recidivism*

It is widely understood that offenders need to receive an adequate amount of treatment, or dosage, in order for it to change their behavior and have an impact on recidivism. This idea is integral to both the risk principle, which asserts that the adequate treatment dosage for high risk offenders is greater than that for low risk offenders, and to the needs principle, which posits that offenders need to receive adequate dosage of the particular types of treatment that have been proven to address their criminogenic needs. However, the question of just *how much* treatment is necessary in order to have an effect remains an open one, and there is an emerging literature that seeks to investigate the impact of different treatment dosages on recidivism.

#### *Report Highlights...*

Research indicates that offenders must receive an adequate dosage of correctional treatment in order for it to have an impact on recidivism.

Treatment dosage is usually measured in terms of its duration and intensity (i.e., hours of treatment, number of programs completed, length of stay in the program).

Prior studies show that DRC clients who successfully complete their programs and spend more days in DRC custody are less likely to recidivate.

Most studies in this area measure dosage in terms of the duration of treatment (i.e., hours, days, or units of programming) and seek to establish precise guidelines for how long offenders should receive services. For example, in a meta-analysis of 200 studies of treatment programs for serious juvenile offenders, Lipsey (2009) finds that programs are more effective if they last for at least six months and provide at least 100 hours of programming. As one might expect, higher dosage levels appear to be necessary for adult offenders. Sperber, Latessa, and Makarios (2013) find that high risk offenders in community corrections programs need at least 200 hours of treatment in order for it to have an effect on recidivism. Likewise, Bourgon and Armstrong (2005) report that, for prison inmates, at least 200 hours of treatment is needed in order to have an impact on moderate risk offenders, but that even 300 hours of treatment is insufficient for offenders with high levels of risk and many criminogenic needs. These findings have been interpreted as meaning that a minimum of 300 hours of treatment is needed to have an impact on high risk offenders in a prison setting. With respect to DRCs, Martin, Lurigio, and Olson (2003) find that offenders are significantly less likely to be rearrested or reincarcerated when they spend at least 70 days in the program. Similarly, Barton and Roy (2005) observe that DRC clients who stay in their programs for 180 days or more are less likely to recidivate compared to those who stay for a shorter period of time. These results suggest that DRC clients generally benefit from greater treatment dosage, and provide some initial evidence concerning the minimum length of stay necessary for participation in a DRC program to have an effect on recidivism.

Studies of DRCs have also investigated how the manner clients exit the DRC program affects the likelihood that they will reoffend. In this regard, a number of studies find that DRC clients who complete their program successfully are much less likely to recidivate than those who experience an unsuccessful termination (Barton & Roy, 2005; Craddock, 2000, 2004; Rhyne, 2005; Roy & Grimes, 2002). One way of interpreting this finding is to think of successful program completion as a measure of treatment dosage. Clients who complete their programs successfully can be said to have received the full course of treatment prescribed to them by program staff, and they are likely to have accomplished their individual treatment goals. In contrast, most clients

who receive an unsuccessful termination are removed from the program because they did not attend treatment sessions, failed to make adequate progress, or violated program rules. Thus, in general, one would expect that clients who complete their program successfully receive greater treatment dosage and are more likely to benefit from these services.

### *Recidivism Patterns over Time*

Research indicates that there is a consistent pattern in regard to the timing of recidivism (Kurlychek, Bushway, & Brame, 2006). Most studies find that offenders are much more likely to recidivate during the first few months after release but then become less likely to reoffend over time. For example, an early study of juvenile offenders by Raskin (1987) observed that the risk of recidivism was greatest during the first six months after committing an offense but then declined steadily thereafter. Schmidt and Witte (1988) observed a similar pattern for cohorts of adult offenders released from prison, finding that the risk of recidivism peaked during the first 6-10 months after release. Likewise, several studies of DRC clients also report that recidivism is more likely to occur in the first six months after leaving the program (Craddock, 2000; Martin, Olson, & Lurigio, 2000). More recent studies have built on these findings by examining long-term recidivism patterns using data from longitudinal surveys. They find that the pattern of declining recidivism risk continues steadily for years after an arrest, and that if no new arrests occur, it eventually

declines to the point that an offender's risk of committing an offense is roughly the same as that of a non-offender (Blumstein & Nakamura, 2009; Kurlychek et al., 2006).

The reasons for this pattern of declining recidivism over time are not fully understood, but there are several likely explanations. One possibility is that individuals with an inherently high recidivism risk tend to reoffend quickly, while those with an inherently lower risk of recidivism are more likely to endure for longer periods without reoffending (Huebner & Berg, 2011). Thus, as time goes by, researchers are likely to observe a declining recidivism rate because fewer high risk offenders remain in the study sample. Another potential explanation for this pattern is that, for offenders released from prison, the immediate post-release period presents many significant challenges, such as finding a place to live, securing employment, reestablishing ties with family, and returning to high risk places and situations (Visser & Travis, 2003, p. 96). If offenders can navigate this initial period without committing a new offense, then they are likely to be better equipped to desist from crime over the long term. For offenders in community corrections programs, this reentry process is likely to be somewhat easier, as most of these offenders are able to retain their jobs and places of residence. They are also more likely to preserve personal and family relationships while in correctional custody. However, research suggests that offenders released from community corrections programs still face significant challenges in the immediate post-release period as they adjust to life with less supervision and often lose access to services and resources (Craddock, 2000).

The tendency for most instances of recidivism to occur soon after release has encouraged researchers to investigate the factors that may influence the timing of recidivism. If one can uncover variables that are associated with early recidivism, then it may be possible to significantly reduce overall rates of recidivism by implementing policy changes that specifically target the factors that cause recidivism during this period. In this regard, Huebner and Berg (2011) provide one of the first investigations of the factors that influence risk of recidivism at different points in time after release. Examining a cohort of prison releases, they find that offenders are more likely to recidivate in the first six months if they have committed property offenses, have a history of

#### *Report Highlights...*

Studies show that most instances of recidivism occur within the first 6-10 months after release, and that offenders generally become less likely to recidivate over time.

This is thought to be due to the challenges that many offenders face during the initial reentry period following release (e.g., securing housing and employment, returning to high risk places and situations, reestablishing ties with family, loss of services and supervision).

Research suggests that certain predictors may be especially effective at predicting recidivism during this crucial early period.

drug use, are unmarried, have a longer criminal history, and have spent a shorter period of time in correctional custody. These findings offer a first step toward uncovering a set of predictors that relate specifically to recidivism during the crucial period initially following release. However, much remains to be learned, especially with regard to offenders released from community corrections programs.

## DATA AND METHODS

### *Sample Selection*

This study investigates the predictors of recidivism by examining a sample of 1,495 direct sentence clients released from DRC programs in 2011. Direct sentence clients comprise the most appropriate sample for studies of recidivism because they typically spend significant periods of time in DRC custody (i.e., about nine months on average) and are expected to receive a range of rehabilitative and supervisory services. The sample contains releases from the year 2011 in order to make it possible to track recidivism over the course of a 24-month follow-up period. This is the same sample that was used in a previous report on determinants of successful program completion (Spence & Haas, 2014); the only difference is that it excludes 535 clients who were terminated from the DRC program and transferred directly into the custody of a state prison or regional jail. These clients were removed from the recidivism sample because they were never released from correctional custody, and were therefore not at risk of reoffending.

### *Data Sources*

The primary source of data for this study is the Community Corrections Information System (CCIS). The CCIS is a statewide data system that is utilized by all West Virginia DRCs and contains information on a broad array of variables related to the characteristics and experiences of DRC clients. This information is entered into the system directly by DRC staff, and the database is managed by the Office of Research and Strategic Planning (ORSP) in the Division of Justice and Community Services (DJCS).

In addition, this study makes use of recidivism data provided by three other sources. First, we employ arrest data gathered from criminal history records provided by the WV

### *Report Highlights...*

This study examines a sample of 1,495 direct sentence DRC clients terminated from programs in 2011. This is the same sample that was employed in a prior study of the determinants of successful program completion.

Recidivism is measured as a) an arrest for a new offense, b) a new regional jail booking, and c) a commitment to a state prison within 24 months of clients release from the DRC.

These recidivism measures capture a broad array of recidivist behavior and record any instance in which a former DRC client continues to have an impact on the state's correctional resources.

Multiple bivariate and multivariate tests are performed, including logistic regression and area under the curve (AUC) analysis to examine the predictors of recidivism.

State Police. Second, we utilize jail bookings data provided by the WV Regional Jail and Correctional Facility Authority (RJCF) TAG database. The TAG database provides information about all regional jail bookings throughout the state. Finally, we also track recidivism using incarcerations data that is provided by the WV Department of Corrections. This data captures any instance in which an individual is committed into the custody of a state prison or jail.

### *Measurement*

Recidivism is generally understood to be a relapse by an offender into prior patterns of criminal behavior, and it is typically measured by the occurrence of arrests or incarcerations for new offenses. Since different approaches to measuring recidivism can result in different baseline recidivism rates, it is considered best to employ multiple measures of recidivism when assessing the impact of programs (Duwe & Clark, 2013). For this reason, we employ three different measures of recidivism—*arrest*, *jail booking*, and *incarceration*. These measures capture a broad range of criminal behavior, and record any instance in which a former DRC client continued to have an impact on the state's correctional resources after release.

Each of these measures is treated dichotomously in the analyses, and is coded as 1 if the client was arrested, booked, or incarcerated at least once during the two-year study period and 0 otherwise. In the analyses that examine the patterns of recidivism over time, we consider the client to have recidivated on the date when they experienced their first arrest, jail booking, or incarceration.

We examine the relationship between these recidivism outcomes and a number of different factors that have been identified by the literature as predictors of recidivism. Our primary focus is on two factors. The first is *successful program completion* which is a dichotomous variable that indicates whether or not a client successfully completed their DRC sentence. Successful terminations are indicated by DRC staff in the CCIS and are comprised of all clients who completed all of the court-ordered requirements of their sentence. The second is *LS/CMI risk score* which is the total recidivism risk score assigned to clients by staff using the LS/CMI assessment tool. This score ranges from 0-43 with higher scores indicating a greater assessed risk of recidivism.

In addition, we examine several other variables related to clients' demographic and legal characteristics, some of which have been included in previous studies of program completion. *Age* is a continuous variable which records the age of clients (in years) when they were terminated from their programs. *Gender* and *race/ethnicity* are both dichotomous variables coded as 1 for female and minority (or nonwhite) respectively. Likewise, the dichotomous variable *employment status* is coded as 1 for all clients who are unemployed, while *education status* is coded as 1 for clients with a high school degree or equivalent (GED). Since the literature suggests that clients are more likely to succeed when they have a stable living environment or social support structures, we also include two measures of clients' living situations. *Living with parents* and *living with spouse/partner* are both dichotomous variables that indicate whether a client is living with their parents or with a significant other respectively. Regarding clients' legal characteristics, we also include a criminal history measure which records the number of prior felony or misdemeanor convictions. We also include two dichotomous variables

**Table 1**  
**Descriptive Statistics for All Variables Included in Analyses (N = 1,495)**

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min.</i>	<i>Max.</i>
<b>Dependent Variables</b>					
Arrest	1,295	0.45	0.49	0	1
Booking	1,495	0.29	0.45	0	1
Incarceration	1,495	0.05	0.23	0	1
<b>Independent Variables</b>					
Age	1,495	32.50	10.15	18	70
Female	1,495	0.27	0.44	0	1
Minority	1,495	0.06	0.24	0	1
High School Graduate	1,340	0.66	0.47	0	1
Unemployed	1,190	0.36	0.48	0	1
Prior Convictions	1,495	1.66	3.69	0	9
Felony Placement Offense	1,252	0.32	0.47	0	1
Property Offense	1,495	0.26	0.43	0	1
Living with Parents	1,495	0.25	0.43	0	1
Living with Spouse	1,495	0.28	0.45	0	1
Length of Stay	1,431	267.73	205.17	1	1,041
Completed Program	1,495	0.69	0.69	0	1
LS/CMI Risk Score	1,069	16.94	7.51	0	40

related to the nature of clients' placement offenses. *Felony offense* is coded as 1 if the client was sentenced in response to a felony offense. *Property offense* is coded as 1 if the most serious placement offense was a property offense. *Length of stay* is a continuous variable which records the number of days that client spent in DRC custody. All variables are measured at the time of the release from the DRC program. Descriptive statistics for all of the variables included in the analyses are presented in Table 1.

### Analysis

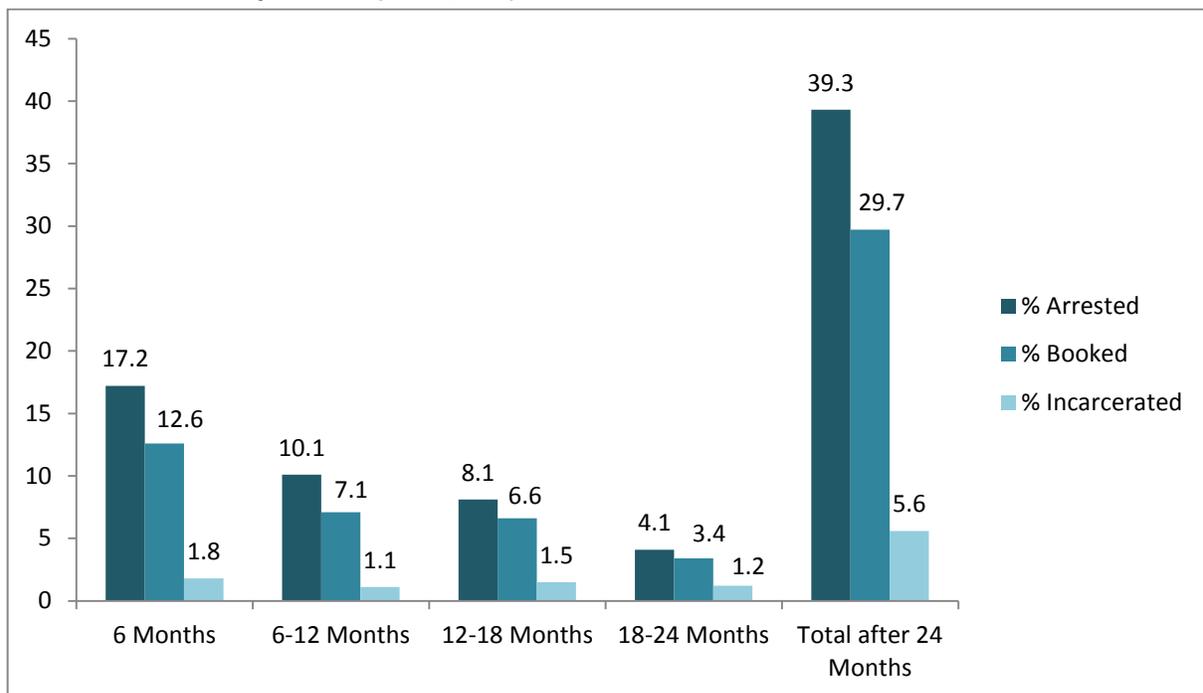
The analysis proceeds in three general stages. First, we conduct bivariate analyses which examine how recidivism rates vary for groups of clients with different characteristics using our three different recidivism measures. We use chi-square tests to determine whether these differences can be considered statistically significant. In the second stage, we build on these findings by constructing multivariate statistical models of the likelihood of recidivism using logistic regression. This approach enables us to estimate the size of the impact that

each causal factor has on the likelihood of recidivism, while also controlling for the confounding effects of other variables. Finally, in the third stage, we conduct chi-square analyses that examine the patterns of recidivism over time. The analyses permit us to determine whether any differences observed in the rates of recidivism over time are large enough to be considered statistically significant.

## RESULTS

Figure 1 displays the cumulative percentage of clients in the sample who were arrested, booked, or incarcerated during the two-year study period. It reveals that most clients in the sample did not recidivate, as only about 39% were arrested within 24 months of release, while roughly 30% were booked into a regional jail and about 6% were incarcerated. However, of those clients who did recidivate most did so within the first six months after release. This is consistent with findings of other studies which observe that recidivism is most likely to occur during this initial six month period. In addition, Figure 1

**Figure 1**  
**Percentage of Direct Sentence Clients Arrested, Booked, or Incarcerated During the 24-Month Follow-Up Period (N = 1,495)**



**Table 2****Offense Type for the First Arrest, Booking, and Incarceration During the 24-Month Follow-Up Period for Direct Sentence Clients Terminated in 2011 (N = 1,495)**

	<u>Arrest</u>		<u>Jail Booking</u>		<u>Incarceration</u>	
	N	%	N	%	N	%
Person	134	17.9	71	16.0	5	4.8
Property	262	35.1	76	17.2	31	36.9
Drug	110	14.7	47	10.6	23	27.4
Public Order	<u>241</u>	<u>32.2</u>	<u>249</u>	<u>57.5</u>	<u>25</u>	<u>29.7</u>
Total	754	100.0	433	100.0	84	100.0

also shows that there is a substantial difference between the percentage of clients who were arrested or booked and the percentage who were incarcerated, suggesting that most arrests and bookings do not result in incarcerations.

The types of offenses associated with recidivism by DRC clients are presented in Table 2. In regard to arrests, it shows that property and public order offenses were the most common, accounting for about 35% and 32% of arrests respectively. For jail bookings, public order offenses were the most common and were associated with nearly 60% of clients' first jail bookings after release. Here, it should be noted that the public order category encompasses a broad array of individual offense types including traffic offenses and DUIs as well as other charges such as disturbing the peace, conspiracy to commit a crime, failure to appear in court, and obstruction of justice. In addition, this category also includes a substantial number of jail bookings (about 15%) where clients were charged with probation or parole violations but no further information about the nature of the violation was provided. In regard to incarcerations, Table 2 reports that property crimes were the most common (36.9%), followed by public order (29.7%) and drug offenses (27.4%). Although data on offense class is not available for bookings and incarcerations, the arrest data indicate that about 54% of clients' first arrests were for misdemeanors while 46% were for felonies.

Table 3 presents the rates of arrests, jail bookings, and incarcerations for groups of clients with different demographic characteristics. It also reports the results of chi-square analyses, which provide an indication of whether any differences that are observed between groups are large enough to be considered statistically significant. The results of these analyses reveal a number of interesting

*Report Highlights...*

Most DRC clients in the sample are single, white males between the ages of 20 and 29.

About 25% lived with their parents when released from the DRC while 28% lived with their spouse or partner.

At the time of release, 36% of clients were unemployed and 66% had a high school diploma or GED.

Within the first 24 months post-release, 39.3% of clients in the sample were arrested, 29.7% were booked into a regional jail, and 5.6% were incarcerated in a state prison.

Clients were most likely to recidivate within the first 6 months after release. After this initial period, the rate of recidivism decreased steadily over time.

About 35% of clients' first post-release arrests were related to property offenses, while about 32% were related to public order offenses.

Roughly 58% of clients' first post-release bookings were related to public order offenses.

Among the 84 clients who were incarcerated during the study period, 37% were sentenced in response to a property offense, 29% were sentenced in response to a public order offense, and 27% were sentenced in response to a drug offense.

**Table 3****Client Characteristics and Recidivism Rates for Direct Sentence DRC Clients Terminated in 2011 (N = 1,495)**

	<i>% Arrested</i>	$\chi^2$	<i>% Booked</i>	$\chi^2$	<i>% Incarcerated</i>	$\chi^2$
<b>Age</b> (mean = 32.50, SD = 10.15)						
Under 20	39.1	25.257***	24.7	19.132***	3.5	3.060
20-29	41.1		34.3		6.0	
30-39	38.3		30.7		6.6	
40 and over	24.7		21.0		4.2	
<b>Race</b>						
White	36.6	0.006	29.9	0.264	5.8	0.414
Minority	36.1		27.4		4.2	
<b>Gender</b>						
Male	38.5	6.553*	32.2	12.072***	5.7	0.000
Female	30.2		23.0		5.7	
<b>Living Situation</b>						
Living Alone	34.9	1.172	22.9	6.862	5.3	1.005
Living with Spouse/Partner	36.1		27.3		5.2	
Living with Parents	38.2		28.8		6.4	
Other Living Situation	33.3		36.4		7.1	
<b>Employment Status</b>						
Full-Time/Part-Time Job	34.8	4.554*	27.2	8.506**	4.6	4.289*
Unemployed	41.5		35.1		7.3	
<b>Education Level</b>						
Did Not Graduate High School	40.2	3.877*	30.4	0.305	5.1	0.227
Completed High School	34.2		29.0		5.8	
<b>LS/CMI Risk Score</b> (mean = 16.94, SD = 7.51)						
Very Low	11.8	31.722***	11.4	37.541***	0.0	18.107***
Low	32.9		22.5		2.1	
Medium	32.2		27.3		5.5	
High	44.8		35.9		7.8	
Very High	60.0		56.6		15.1	

Note: \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

findings. First, they show that the risk of recidivism is related to client age. While about 40% of clients under the age of 39 were arrested at least once during the study period, the arrest rate was only 25% for clients who were 40 or older. Likewise, only 21% of clients who were 40 or older were booked into regional jails, a rate that was considerably less than that of clients in their 20s or 30s. In addition, clients in their 20s and 30s were also more

likely to be incarcerated, although this difference was not large enough to be considered statistically significant.

Second, Table 3 also indicates that there are statistically significant differences in the recidivism rates for male and female clients. About 39% of males were arrested and about 32% of males were booked into a regional jail during the study period, compared to an arrest rate and booking rate for female clients of about 30% and 23%

**Table 4****Client Characteristics and Recidivism Rates for Direct Sentence DRC Clients Terminated in 2011 (N = 1,495)**

	<i>% Arrested</i>	$\chi^2$	<i>% Booked</i>	$\chi^2$	<i>% Incarcerated</i>	$\chi^2$
<b>Placement Offense (Type)<sup>a</sup></b>						
Person	35.1	8.262*	27.8	5.702	3.4	8.123*
Property	42.0		34.2		7.4	
Drug	31.2		29.0		7.3	
Public Order	34.0		26.8		4.4	
<b>Placement Offense (Class)<sup>b</sup></b>						
Misdemeanor	34.1	2.106	30.6	0.017	2.9	34.460***
Felony	38.8		30.3		10.9	
<b>Prior Convictions (mean = 1.66, SD = 3.69)</b>						
None	34.3	13.569***	27.8	8.136*	5.7	2.667
1 Prior Conviction	31.0		30.1		5.6	
2 - 5 Prior Convictions	40.5		30.5		4.7	
6 + Prior Convictions	50.5		40.7		8.8	
<b>Length of Stay (mean = 267.7, SD = 205.17)</b>						
Less than 90 days	38.1	10.989*	35.6	6.331	4.9	1.953
90 - 180 days	41.9		28.2		5.7	
181 - 365 days	38.0		27.3		5.1	
366 + days	29.6		29.7		7.0	
<b>Program Completion</b>						
Successful Program Completion	31.6	29.626***	23.9	54.841***	3.9	21.362***
Unsuccessful Program Completion	47.8		42.9		9.9	

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . <sup>a</sup> Statistics are calculated using the most serious offense for each client. <sup>b</sup> Felonies were considered more serious than misdemeanors. Person offenses were considered the most serious type of offense, followed by property offenses, drug offenses, and public order offenses.

respectively. However, males and females had the same rate of incarceration. There are also significant differences in recidivism rates for employed and unemployed clients. Clients who had a part-time or full-time job at the time of release had arrest and booking rates that were about 7-8 percentage points lower than unemployed clients, and had incarceration rates that were almost 3 percentage points lower. These differences were all large enough to be considered statistically significant.

Perhaps the most striking results presented in Table 3 are those related to clients' LS/CMI risk scores. As expected, clients with higher total risk scores are much more likely to recidivate. For example, of those clients who fell into the "very high" risk category (with a score in the range of 30-43), 60% were arrested, 57% were booked into a regional

jail, and 15% were incarcerated before the end of the study period. In contrast, clients with a "very low" risk score (falling in the range of 0-4) had arrest and booking rates of only 12% and 11% respectively. None of the clients who scored in the very low risk range were incarcerated. These differences are all statistically significant at the  $p < 0.001$  confidence level, and the chi-square test statistics for clients' LS/CMI risk scores are larger than those for any other variable presented in Table 3. Furthermore, it is also worth noting that recidivism rates increase in a stepwise fashion for clients at each risk level, suggesting that the LS/CMI accurately predicts recidivism at all levels of risk.

In Table 4, we compare recidivism rates across groups of clients with different legal and programmatic characteristics. Here, the results indicate that clients are significantly more

likely to be arrested or incarcerated during the follow-up period if they were sentenced to the DRC in response to a property offense. Drug offenders are also more likely to be incarcerated than other clients, although they are not more likely to be arrested or booked into jail. In addition, Table 4 shows that although clients who were sentenced to the DRC in response to a felony are not much more likely to be arrested or booked than misdemeanants, they do have a much greater rate of incarceration. Roughly 11% of clients who were sentenced to the DRC in response to a felony were incarcerated within 24 months of release, compared to an incarceration rate of only about 3% for clients sentenced in response to misdemeanors. Conversely, the number of prior convictions was significantly related to arrest and booking rates, but not to rates of incarceration. While about 50% of clients with 6 or more prior convictions were rearrested within 24 months of release, and about 40% of these clients were booked into jail, only about 30% of those clients who had only 1 conviction prior to entering the

DRC were arrested or booked during the follow-up period.

In regard to program characteristics, Table 4 provides some indication that clients who received greater levels of treatment were less likely to recidivate. Clients who spent longer periods of time in DRC custody were generally less likely to be arrested or booked, although these differences were only statistically significant for rates of arrest. Somewhat surprisingly, clients who spent more than a year in DRC custody were actually more likely to be incarcerated. However, this difference was not statistically significant. There is much more consistent evidence in regard to the impact of successful program completion on recidivism. Clients who successfully completed their program were much less likely to recidivate than clients who experienced an unsuccessful termination. While the rates of arrest, booking, and incarceration for unsuccessful clients were about 48%, 43%, and 10% respectively, the rates for successful clients were 32%, 24%, and 4% respectively. Each of these differences was statistically significant.

Although Tables 3 and 4 present some interesting insights into some of the possible sources of variation in recidivism rates for DRC clients, these results do not control statistically for the potential confounding effects of other variables. For this reason, we also estimate multivariate logistic regression models of the likelihood of arrest, booking, and incarceration. In Table 5, we present the coefficient estimates produced by these models. In order to facilitate the interpretation of effect sizes, we also present the odds ratios for those predictors that were statistically significant.

The results of the first model indicate that five variables—*age*, *female*, *prior convictions*, *LS/CMI risk score*, and *successful program completion*—have a statistically significant impact on the likelihood of arrest when controlling for other factors. The negative sign and the odds ratio of 0.969 for the *age* variable indicate that older clients are generally less likely to be arrested, with each additional year of age reducing the predicted odds of arrest by about 3%. The odds ratio of 0.668 for the *female* variable indicates that female clients are about 33% less likely to be arrested than male clients, while the odds ratio of 1.047 for *prior convictions* indicates that each additional prior conviction is associated with a roughly 5% increase in the likelihood of arrest. As expected, *LS/CMI risk score*

#### Report Highlights...

Two variables, *LS/CMI risk score* and *successful program completion*, were significant predictors of all three measures of recidivism after controlling for other factors.

Each additional one-point increase in client risk and needs scores increases the odds of arrest by 7%, the odds of a jail booking by 4.3%, and the odds of incarceration by 8.7%.

On average, successful completion of the DRC program decreases the odds of an arrest by 51%, the odds of a jail booking by 58%, and the odds of incarceration by 67%.

Clients are significantly less likely to be arrested or booked if they are older or if they are female, but are more likely to be arrested if they have a larger number of prior convictions.

Clients who were sentenced to the DRC in response to a felony are 365% more likely than misdemeanants to be incarcerated, but are not more likely to be arrested or booked.

**Table 5****Logistic Regression Estimates for Predictive Factors Associated with Recidivism (N = 1,495)**

<i>Variable</i>	<i>Arrest</i>		<i>Regional Jail Booking</i>		<i>Incarceration</i>	
	<i>B</i> ( <i>SE</i> )	<i>Odds Ratio</i>	<i>B</i> ( <i>SE</i> )	<i>Odds Ratio</i>	<i>B</i> ( <i>SE</i> )	<i>Odds Ratio</i>
Age	-0.031*** (0.009)	0.969	-0.020* (0.009)	0.980	-0.009 (0.020)	
Female	-0.403* (0.194)	0.668	-0.613** (0.197)	0.542	-0.363 (0.405)	
Minority	-0.426 (0.317)		-0.417 (0.331)		-0.533 (0.785)	
High School Graduate	-0.103 (0.181)		0.004 (0.182)		0.681 (0.409)	
Unemployed	0.251 (0.184)		0.226 (0.183)		0.190 (0.376)	
Prior Convictions	0.046* (0.020)	1.047	0.025 (0.190)		0.046 (0.026)	
Felony Offense	-0.113 (0.186)		-0.237 (0.188)		1.295*** (0.381)	3.652
Property Offense	0.068 (0.193)		-0.051 (0.193)		-0.158 (0.390)	
Living with Parents	-0.067 (0.213)		-0.106 (0.215)		-0.451 (0.470)	
Living with Spouse/Partner	0.092 (0.201)		0.113 (0.204)		0.249 (0.418)	
LS/CMI Risk Score	0.047*** (0.012)	1.070	0.042*** (0.012)	1.043	0.084*** (0.025)	1.087
Length of Stay	0.001 (0.001)		0.000 (0.001)		-0.002 (0.001)	
Successful Program Completion	-0.706*** (0.195)	0.494	-0.861*** (0.189)	0.423	-1.087* (0.384)	0.337
N	651		766		766	
Nagelkerke R-Squared	0.147		0.123		0.212	
AUC	0.688		0.680		0.820	

Note: \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

**Table 6****Descriptive Statistics for Level of Service/Case Management Inventory (LS/CMI) Section Scores (N = 1,069)**

<i>LS/CMI Section</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min.</i>	<i>Max.</i>
Procriminal Attitude	0.84	1.15	0	6
Companions	1.92	1.50	0	4
Antisocial Pattern	0.97	1.01	0	4
Criminal History	2.66	1.95	0	8
Family/Marital	1.42	1.21	0	6
Education/Employment	3.98	2.65	0	9
Leisure/Recreation	1.41	0.77	0	4
Alcohol/Drug Problem	3.73	2.13	0	6

has a positive impact on recidivism, with the odds of ratio 1.070 indicating that each additional one-point increase in the total risk score produces a 7% increase in the odds of arrest. Thus, the model predicts that a client with an LS/CMI score of 24 (i.e., the average score for clients falling into the “high risk” group) is 112% more likely to be arrested than a client with an LS/CMI score of 8 (i.e., the average score for clients falling into the “low risk” group). Finally, *successful program completion* has a significant negative impact on recidivism, with the odds ratio of 0.494 indicating that successful clients are about 51% less likely to be arrested, on average, than unsuccessful clients.

The second model examines the likelihood that clients will be booked into a regional jail. Here, the results indicate that, with the exception of *prior convictions*, the same set

of explanatory variables that have a statistically significant impact on the likelihood of arrest—*age*, *female*, *LS/CMI risk score*, and *successful program completion*—also have a significant effect on the likelihood of being booked into jail. The odds ratio of 0.980 for the *age* variable indicates that each additional year of age decreases the odds of being booked by about 2%, while the odds ratio of 0.542 for the *female* variable indicates that female clients are about 46% less likely to be booked than male clients. The *LS/CMI risk score* variable also has a significant effect, with the odds ratio indicating that each additional one-point increase in the total risk score produces a 4.3% increase in the likelihood that a client will be booked into a regional jail. The final statistically significant predictor of jail bookings is *successful program completion*. Here,

**Table 7****Bivariate Correlations for Level of Service/Case Management Inventory (LS/CMI) Total and Section Scores with Arrests, Jail Bookings, and Incarcerations (N = 1,495)**

	<i>Arrest</i>	<i>Jail Booking</i>	<i>Incarceration</i>
Total Risk and Needs Score	0.214**	0.185***	0.151***
LS/CMI Section			
Procriminal Attitude	0.01	0.01	0.01
Companions	0.164**	0.102**	0.142**
Antisocial Pattern	0.111**	0.105**	0.077*
Criminal History	0.188**	0.201**	0.159**
Family/Marital	0.071*	0.061*	0.034*
Education/Employment	0.142**	0.132**	0.107**
Leisure/Recreation	0.099**	0.089**	0.063*
Alcohol/Drug Problem	0.157**	0.109**	0.084**

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 8****Area-Under-the-Curve Statistics for Level of Service/Case Management Inventory (LS/CMI) Total and Section Scores for Arrests, Jail Bookings, and Incarcerations (N = 1,495)**

	<i>Arrest</i>	<i>Jail Booking</i>	<i>Incarceration</i>
Total Risk and Needs Score	0.623	0.613	0.679
LS/CMI Section			
Procriminal Attitude	0.504	0.505	0.524
Companions	0.592	0.563	0.669
Antisocial Pattern	0.561	0.562	0.598
Criminal History	0.606	0.603	0.678
Family/Marital	0.540	0.537	0.631
Education/Employment	0.581	0.581	0.542
Leisure/Recreation	0.551	0.548	0.561
Alcohol/Drug Problem	0.591	0.567	0.593

Note: All AUC statistics are derived from separate logistic regression models that contain only the relevant LS/CMI subcomponent score.

the model predicts that successful clients are about 58% less likely to be booked than unsuccessful clients.

In the third model, we examine the likelihood that clients will be committed to the custody of a state prison. The results of this model indicate that three variables—*felony offense*, *LS/CMI risk score*, and *successful program completion*—have a statistically significant impact on the odds of incarceration. In regard to *felony offense*, the odds ratio of 3.308 indicates that clients who were sentenced to the DRC in response to a felony offense are about 3.3 times more likely to become incarcerated post-release than those who were sentenced in response to a misdemeanor. *LS/CMI risk score* also has a strong impact on the odds of incarceration, with each additional one-point increase in the total risk score increasing the odds of incarceration by about 9%. The odds ratio of 0.378 for *successful program completion* indicates that clients who successfully completed their programs were about 62% less likely to become incarcerated than unsuccessful clients, all else being equal.

In order to further assess the predictive validity of the models, we conduct area-under-the-curve (AUC) analyses and report the AUC statistics for each of the models at the bottom of Table 5. The AUC test statistic is simply the ratio of correct to incorrect prediction outcomes generated by the model. The AUC statistic for first model, which predicts the likelihood of arrest, is 0.688, indicating that the model correctly predicts about 69% of client outcomes correctly. Likewise, the AUC statistic for the second model is 0.680, indicating that in 68% of

*Report Highlights...*

The multivariate model predicts about 68% of outcomes correctly in regard to arrests and bookings, and it predicts about 82% of outcomes correctly in regard to incarcerations.

A model that includes only clients' total LS/CMI risk scores correctly predicts arrest and booking outcomes in about 62% of cases, and correctly predicts incarceration outcomes in about 68% of cases.

All of the LS/CMI subcomponent scores are significantly and positively correlated with arrests, bookings, and incarcerations, except for the procriminal attitude subcomponent.

Of the LS/CMI subcomponents, criminal history is the most effective predictor of recidivism. A model that contains only clients' criminal history subcomponent scores correctly predicts arrest and booking outcomes in about 60% of cases and incarceration outcomes in 67% of cases.

The companions, alcohol/drug problem, and education/employment subcomponents were also very effective predictors of recidivism.

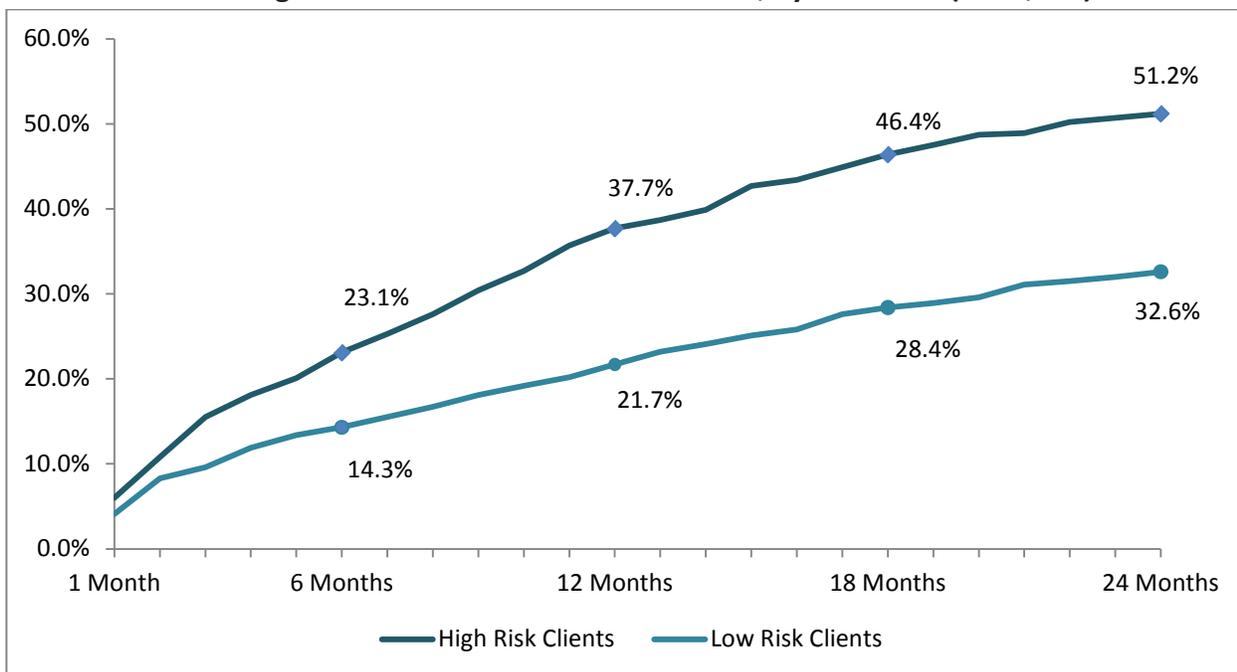
The procriminal attitude and family/marital subcomponents were the weakest predictors of recidivism.

cases, the variables in the model correctly predict whether or not clients will be booked into jail. The AUC statistic is greatest for the third model. It indicates that this model correctly predicts incarceration outcomes for about 82% of the clients in the sample. The AUC statistics for all three models fall near the value of 0.700, which is generally considered the benchmark for effective predictive models (Van Voorhis, Wright, Salisbury, & Bauman, 2010).

Given the importance of the LS/CMI assessment tool for DRC staff, we also report the results of several additional analyses which examine the predictive validity of the LS/CMI. First, in Table 6, we present the descriptive statistics for clients' scores on each of the eight subsections of the LS/CMI. Then, in Table 7, we present the bivariate correlations between these subsection scores and the three recidivism measures. Each subsection addresses a different criminogenic need and the scores for the eight subsections are summed in order to produce the final score. The results indicate that the total risk and needs score is significantly correlated with all three measures of recidivism. All of the subsections are also significantly and positively correlated with recidivism, except for the subsection addressing procriminal attitudes. Although the size of these correlations is fairly small, this is likely due to the low base

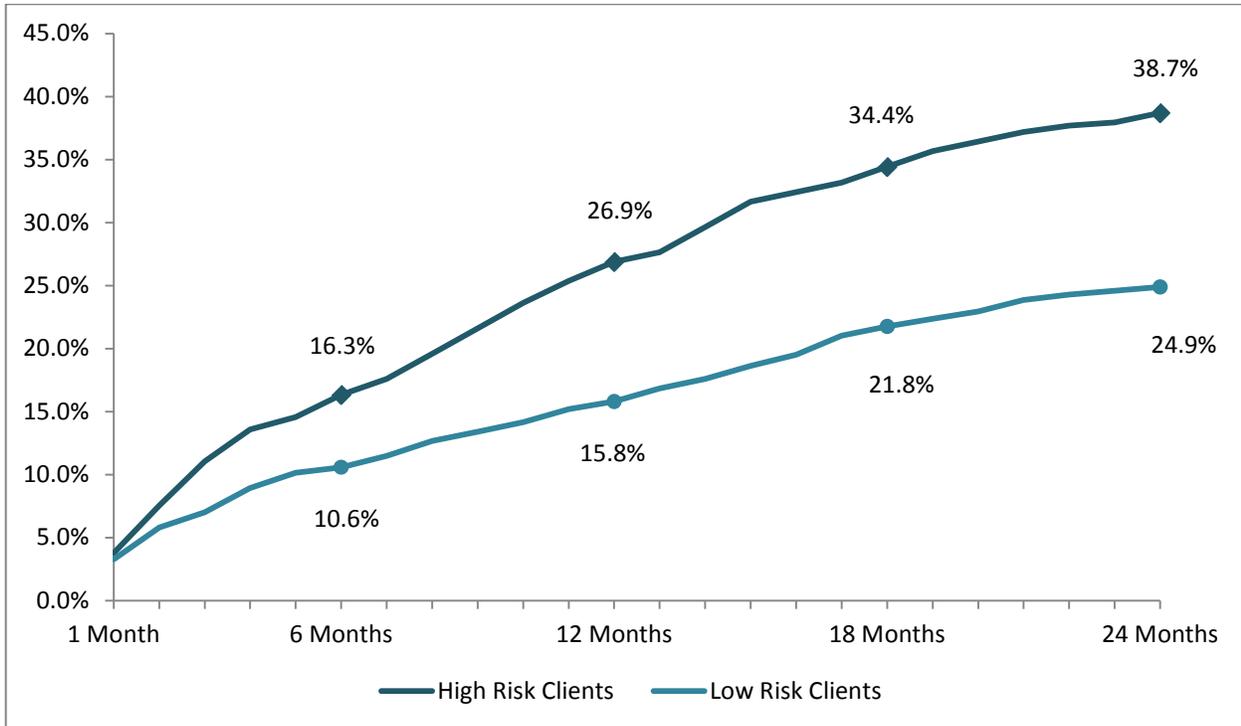
rate of the dependent variables. Table 8 reports the results of a series of AUC analyses that assess the ability of the total LS/CMI risk score and the scores for the individual subcomponents to predict recidivism. The AUC statistic offers a better estimate of the LS/CMI's predictive validity than bivariate correlation coefficients because it is not affected by the base rate of the dependent variables (Rice & Harris, 2005). Here, the AUC statistics of 0.623 for arrests and 0.613 for bookings indicate that the total LS/CMI risk score correctly predicts client outcomes about 62% of the time for both dependent variables. Likewise, the AUC statistic of 0.679 for incarcerations indicates that it correctly predicts incarceration outcomes in about 68% of cases. This is notable because the AUC statistics for the full multivariate models presented in Table 5 were only slightly higher. For example, the AUC statistics for the multivariate models predicting the likelihood of arrests and bookings were 0.688 and 0.680 respectively. Thus, the addition of all of the other variables in those models only made it possible to correctly predict outcomes in an additional 6% of cases that were not already correctly predicted by LS/CMI risk scores alone. Likewise, the addition of the other variables included in the full model of incarceration only made it possible to successfully predict

**Figure 2**  
**Cumulative Percentage of DRC Clients Arrested over Time, by Risk Level (N = 1,495)**



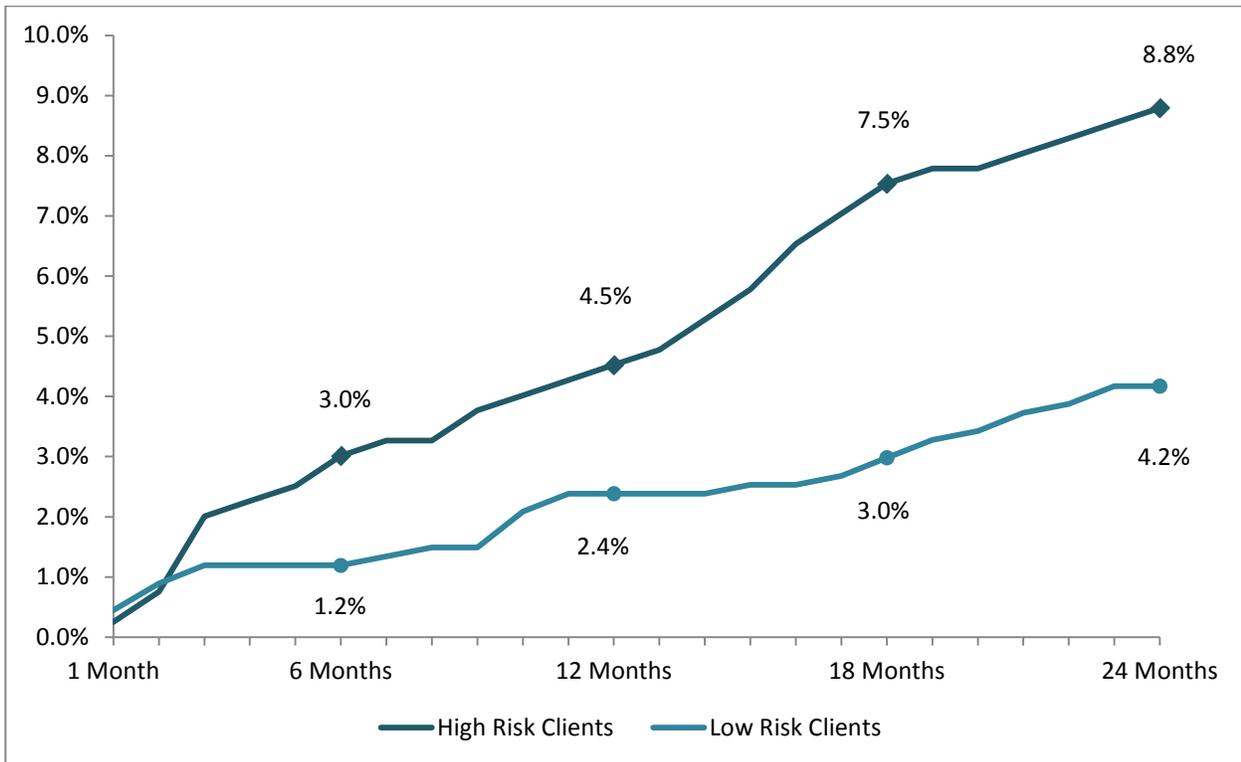
**Figure 3**

**Cumulative Percentage of DRC Clients Booked over Time, by Risk Level (N = 1,495)**



**Figure 4**

**Cumulative Percentage of DRC Clients Incarcerated over Time, by Risk Level (N = 1,495)**



**Table 9****Recidivism Rates for Successful and Unsuccessful DRC Clients over Time (N = 1,495)**

Months after Release	<i>Successful Completion</i>		<i>Unsuccessful Completion</i>		$\chi^2$
	<i># Arrested</i>	<i>% Arrested</i>	<i># Arrested</i>	<i>% Arrested</i>	
Months after Release					33.926***
1-6 Months	131	14.6	126	31.3	
7-12 Months	90	10.0	60	14.9	
13-18 Months	86	9.6	35	8.7	
19-24 Months	39	4.3	21	5.2	
Months after Release					74.912***
1-6 Months	86	8.3	102	22.3	
7-12 Months	61	6.4	45	12.7	
13-18 Months	70	7.8	29	9.3	
19-24 Months	31	3.8	20	7.1	
Months after Release					24.293***
1-6 Months	10	1.0	17	3.8	
7-12 Months	9	0.8	8	1.8	
13-18 Months	11	1.1	11	2.6	
19-24 Months	9	0.9	9	2.2	

incarceration outcomes in an additional 14% of cases. These findings provide strong evidence that the LS/CMI risk score is a consistent, effective predictor of recidivism.

As one would expect, the AUC statistics for each of the subsection scores are generally lower than those for the total score. However, all of the subsections had AUC statistics that were above 0.500, indicating that they successfully predict outcomes in a majority of cases. The subsections that were the most effective predictors of recidivism were those related to companions and criminal history. These sections had AUC statistics near 0.600 in regard to predicting arrests and bookings, and near 0.670 in regard to predicting incarcerations. Other subsections, such as those related to antisocial personality patterns, family/marital issues, leisure/recreation needs, and alcohol and drug problems, also achieved a relatively high degree of validity, correctly predicting about 55-60% of recidivism outcomes. The subsection related to procriminal attitudes was the weakest predictor of recidivism, with AUC statistics that ranged from 0.504 to 0.524. This is surprising, given that procriminal attitudes are considered by the literature to be among the most important criminogenic needs and are a major target for cognitive-behavioral interventions.

In Figures 2, 3, and 4, we begin our examination of the

### *Report Highlights...*

Most clients who recidivate experience their first arrest or jail booking within 6 months of release.

During this initial 6-month period, high risk clients are especially likely to recidivate.

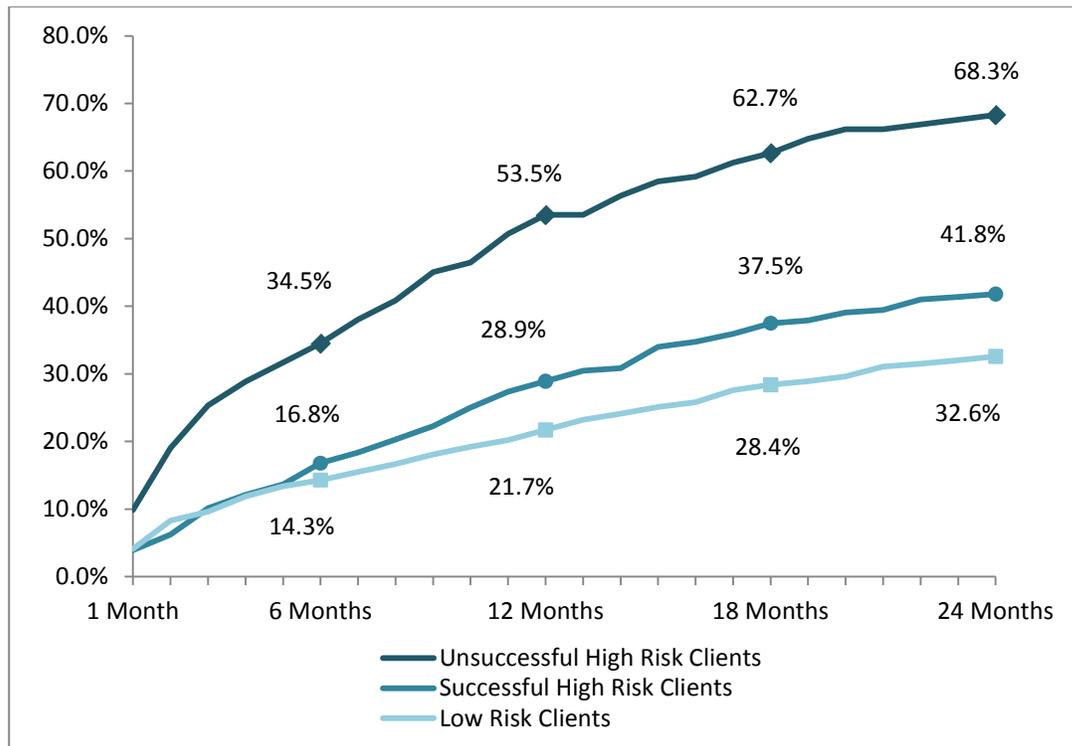
Successful completion of the DRC program significantly reduces the likelihood that high risk clients will be arrested, booked, or incarcerated.

The effects of successful program completion are greatest during the first 6-9 months post-release. During this period, successful high risk clients exhibit recidivism patterns that are similar to those of low risk clients.

In contrast, high risk clients who fail to complete the program successfully tend to recidivate soon after release, and continue to exhibit higher rates of recidivism throughout the study period.

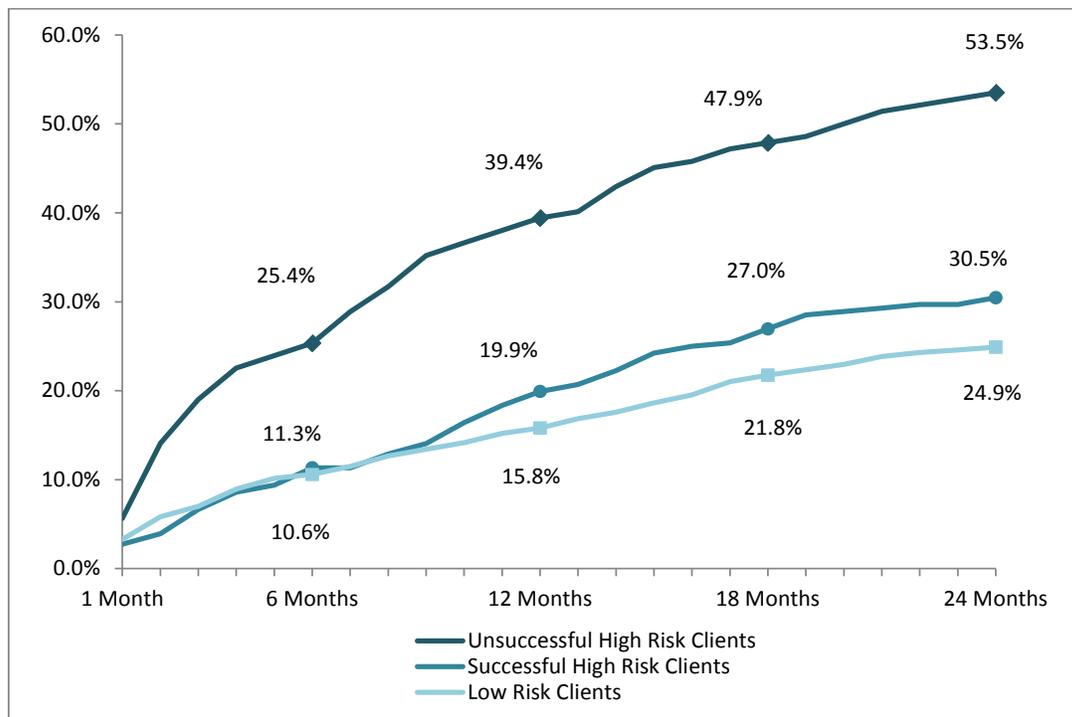
**Figure 5**

**Cumulative Percentage of DRC Clients Arrested over Time, by Risk Level and Manner of Exit (N = 1,495)**



**Figure 6**

**Cumulative Percentage of DRC Clients Booked over Time, by Risk Level and Manner of Exit (N = 1,495)**

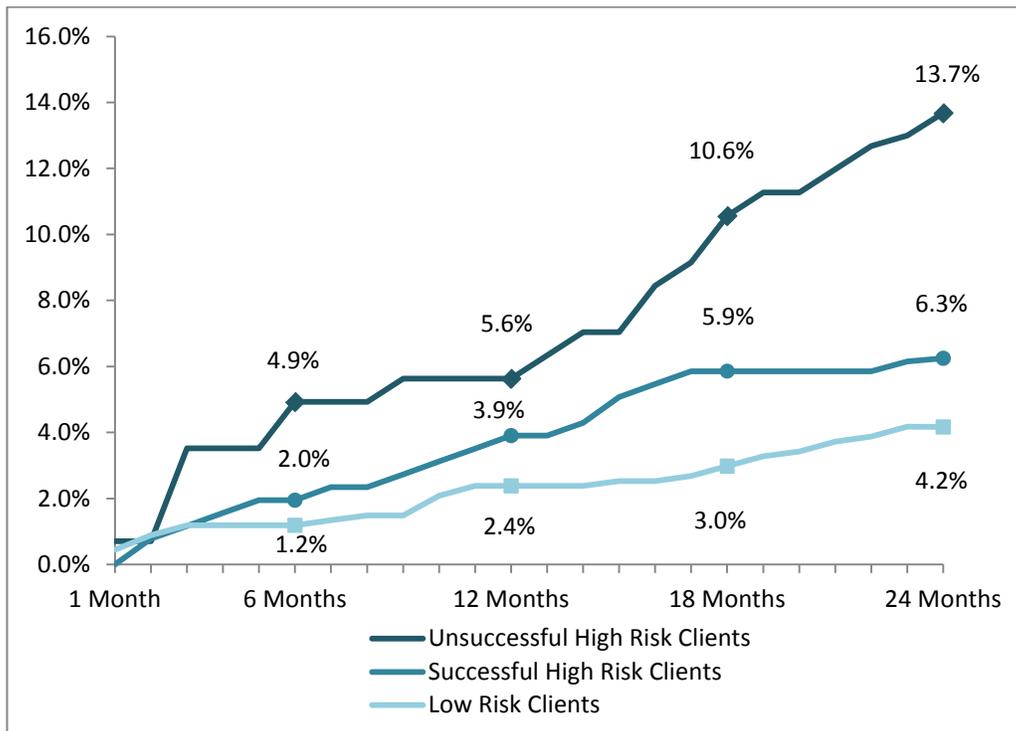


patterns of recidivist behavior over time. Figure 2 displays the cumulative arrest rates over time for groups of clients with different LS/CMI risk levels. Figures 3 and 4 provide the same information in regard to jail bookings and incarcerations. Together, these figures reveal a common pattern in regard to the timing of recidivism. They show that high and low risk clients exhibit similar rates of recidivism during the first 1-2 months after release, but then quickly diverge, with high risk clients recidivating at a much higher rate throughout the rest of the study period. This is consistent with the findings of prior studies which observe that the first 6-10 months after release is a crucial period in which offenders must adjust to the challenges associated with reentry, and are likely to establish patterns of behavior that will have a strong impact on the likelihood that they will reoffend. The data presented here suggest that the paths of low and high risk DRC clients diverge shortly after release, with high risk clients moving in a direction that entails a significantly greater risk of recidivating.

Table 9 examines how the manner in which clients exit the DRC program impacts the timing of recidivism. It

reports the recidivism rates for successful and unsuccessful clients during successive 6-month intervals following their release from DRC custody. These results show that unsuccessful clients were generally more likely to recidivate than successful clients through the 24-month follow-up period, but that the difference in recidivism rates between unsuccessful and successful clients was greatest during the first six months post-release. For example, while 31% of unsuccessful clients were arrested within the first six months post-release, only about 15% of successful clients were arrested during this time period. Similarly, about 22% of unsuccessful clients were booked and about 4% were incarcerated during the first six months, compared to booking and incarceration rates of 8% and 1%, respectively, for clients who completed the program successfully. Thus, unsuccessful clients were generally about 2 to 4 times as likely to recidivate during the first six months post-release. While successful clients were also less likely to recidivate during other time periods, the differences between successful and unsuccessful clients during these time periods are more modest.

**Figure 7**  
**Cumulative Percentage of DRC Clients Incarcerated over Time, by Risk Level and Manner of Exit (N = 1,495)**



These findings suggest that successful completion of the DRC program may change the patterns of recidivist behavior over time by reducing the likelihood that clients will recidivate during the first six months after release. This conclusion is further supported by the results of the chi-square analyses reported in Table 9, which indicate that the differences in recidivism rates that are observed between successful and unsuccessful clients are large enough to be considered statistically significant at the  $p < 0.001$  confidence level for all three measures of recidivism.

In Figures 5, 6, and 7, we examine the impact of successful program completion on recidivism patterns over time for clients with a high level of recidivism risk. In essence, these figures report the same information that is reported in Figures 2, 3, and 4, but divide high risk clients into two groups based on whether or not they completed the program successfully. Consistent with the risk principle, Figure 5 shows that high risk clients who completed the program successfully were much less likely to recidivate than high risk clients who experienced an unsuccessful termination. This effect was greatest during the first six months after release. During this period, the cumulative arrest rate for successful high risk clients was 16.8%, a rate that was only slightly higher than the 14.3% experienced by low risk clients. Thus, for the first six months after release, successful high risk clients exhibited recidivism patterns that were quite similar to those of low risk clients. In contrast, the rate of arrest increased rapidly for unsuccessful high risk clients, and within the first six months post-release this group had an arrest rate that was more than twice as high as that of other clients.

Figure 6 reveals a similar pattern in regard to the timing of regional jail bookings. Within the first nine months after release, successful high risk clients experienced a cumulative booking rate that was very similar to that of low risk clients. Approximately 11% of the clients in both of these groups were booked in the first six months post-release, and there was only a 5 percentage point difference in the booking rates for these groups by the end of the study period. Conversely, the booking rate for unsuccessful high risk clients quickly diverged from that of other clients. About 25% of unsuccessful clients were booked within the first six months, and the booking rate increased to more than 53% by the end of the study period.

Finally, Figure 7 also reports similar findings in regard

to incarceration rates. It shows that high risk clients who successfully completed the program experienced an incarceration rate that was very similar to that of low risk clients during the first few months post-release, and stayed within 2 to 3 percentage points of the rate experienced by low risk clients throughout the study period. However, high risk clients who failed to successfully complete the program experienced much higher incarceration rates throughout the study period. As with arrests and bookings, the incarceration rate for unsuccessful high risk clients diverged from that of other clients during the first six months post-release and increased steadily thereafter. By the end of the study period, nearly 14% of unsuccessful high risk clients were incarcerated, compared to only 6% of successful high risk clients, and 4% of low risk clients.

## DISCUSSION AND CONCLUSION

This report has three primary objectives: to assess the efficacy of WV DRC programs, to investigate the factors that predict recidivism by DRC clients, and to examine the timing of recidivist behavior by clients during the first 24 months after release. In each of these areas, the findings produced by this report yield

### *Report Highlights...*

Clients who successfully completed their DRC sentence were significantly less likely to be arrested, booked into a regional jail, or committed to prison.

However, only 51% of clients completed the program successfully, suggesting staff can enhance the impact of DRC programming by working to improve completion rates.

In the multivariate analyses, LS/CMI risk scores were the strongest predictor of rearrests, bookings, and prison commitments.

This provides compelling evidence that the LS/CMI is an effective predictor of recidivism.

a number of important implications for DRC staff and administrators as well as state policy-makers and planners.

In regard to the first objective, the results of this report show that clients who successfully completed the DRC program were significantly less likely to be arrested, booked into a regional jail, or incarcerated in a state prison than those who were terminated from the program. Consequently, this report provides evidence that DRC programming has a positive impact on client outcomes, and suggests that DRCs should continue to play an active role in the state's efforts to supervise and rehabilitate offenders. However, given that only 51% of the clients in the study sample completed the program successfully, this report also suggests that DRC staff and administrators may be able to further enhance the impact of DRC programming on recidivism by working to improve successful completion rates. Research shows that techniques such as motivational interviewing and the proper use of reinforcements and incentives can increase the likelihood that offenders will complete correctional rehabilitation programs successfully (Harper & Hardy, 2000; Miller & Rollnick, 2002). Likewise, a prior study (Spence & Haas, 2014) found that the likelihood of successful program completion was significantly related to a variety of client characteristics, including age, gender, criminal history, and LS/CMI risk scores. These findings highlight the importance of keeping clients engaged in the program, and they suggest that staff may be able to maximize the effectiveness of retention efforts by targeting those clients who have the greatest risk of termination with additional resources and support.

As for the second objective, this report identifies several factors that are predictive of recidivism by DRC clients. Consistent with the broader recidivism literature, the bivariate analyses reveal that clients are generally more likely to recidivate if they have higher LS/CMI risk scores, if they are younger, less educated, male, unemployed, and have more serious criminal histories. These findings suggest that the factors driving recidivism by WV DRC clients are generally similar to those observed in studies of other offender populations. In the multivariate analyses, clients' LS/CMI risk scores stand out as having a strong, statistically significant relationship with all three measures of recidivism (arrests, bookings, and incarcerations). Furthermore, the results of the area-under-the-curve analyses indicate that a model that includes only clients'

### *Report Highlights...*

DRC clients were much more likely to recidivate in the first 6 months post-release, especially if they were assessed as having a high level of risk.

However, DRC clients were much less likely to recidivate during this initial period if they completed the program successfully, and these effects were greatest for high risk clients.

It may be possible to significantly reduce recidivism rates by emphasizing this initial 6-month period in post-release supervision strategies and by concentrating these efforts on high risk clients.

LS/CMI risk scores successfully predicts client outcomes in more than 60% of cases, and that the addition of all of the other variables included in the full model result in only modest improvements to its predictive accuracy.

The strong relationship that is observed between risk scores and each of the three recidivism measures provides compelling evidence that the LS/CMI risk assessment tool is an effective predictor of recidivism. These results therefore provide a partial validation of the accuracy of the LS/CMI tool with regard to the DRC client population in West Virginia. Yet, while the total LS/CMI risk scores are closely related to recidivism, the analyses of the validity of the subcomponent scores revealed some potential issues. In this regard, perhaps the most striking finding is that the scores for the subsection of the LS/CMI related to procriminal attitudes are not significantly correlated with arrests, bookings, or incarcerations. This is surprising, given that this subcomponent is generally expected to be one of the most effective predictors of recidivism because it captures many of the thought processes and orientations associated with criminal behavior. One potential explanation for this null finding is suggested by the descriptive statistics which show that the average score for clients on this subsection was 0.84, which means that the average client in the sample was classified as having a low level of risk in this area (scores in this subsection can range between 0 and 4). In contrast, norming research indicates that, nationally, the average scores for this subsection are

about 2.33 for community offenders (Davidson, Haas, Spence, & Arnold, 2015). This suggests that, in regard to procriminal attitudes, the criminogenic needs of the clients of the sample may have been underassessed. This is not unlikely since procriminal attitudes are typically seen as one of the most difficult criminogenic needs to assess. As a result, this report suggests that the predictive validity of the LS/CMI could be further enhanced by additional training and other efforts to improve the implementation of the procriminal attitude subcomponent.

The third objective of this study was to examine the timing of recidivism. Here, the results show that most clients who recidivate tend to do so within the first six months after release, and that high risk clients tend to recidivate sooner than low risk clients. This accords with the findings of prior studies which identify the first 6-10 months post-release as a crucial period during which recidivism is most likely to occur (Huebner & Berg, 2011). However, the results also indicate that clients are much less likely to recidivate during this initial period if they complete the program successfully. This finding suggests that the successful completion of DRC programming may alter recidivism patterns over time and may leave clients better suited to adjust to changes associated with release from the DRC custody. Consistent with the risk principle, these effects were greatest for high risk clients. High risk clients who completed the program successfully were much less likely to recidivate than other high risk clients, and they exhibited recidivism patterns which were very similar to those of low risk clients during the first six months post-release. This finding suggests that it may be possible to reduce recidivism rates by emphasizing this initial six month period in post-release supervision strategies and by concentrating these efforts on high risk clients.

In addition to the policy implications raised by this study, there are several ways in which future research can build on the findings produced here. One possibility is to investigate the predictive variables associated with recidivism that occurs in different time periods after release. Prior studies of prison release have found that certain factors (e.g., drug dependence, lack of adequate housing) are more strongly associated with recidivism that occurs within the first six months post-release, while others (e.g., being unmarried, not having children) are associated

with recidivism that occurs in later periods (Huebner & Berg, 2011). It is possible that similar patterns may also be observed with regard to DRC clients. Research in this area could help DRC staff to better identify those clients who are at the greatest risk of recidivating shortly after release.

Another opportunity for future research is to assess the impact of particular types of treatment programs and interventions on recidivism. For example, one might compare the effects of different types of interventions on recidivism or examine whether interventions are more effective when they are delivered in ways that adhere to the risk and needs principles.

A final area for further research concerns the impact of different treatment dosage levels on recidivism. While this study finds that clients who completed the program successfully were less likely to recidivate, the evidence was less clear in regard to their length of stay. Clients who stayed in the program longer were less likely to be arrested, but this relationship was only statistically significant in the bivariate analyses. Future studies could examine the effects of different treatment dosages using other measures, such as the number of hours of treatment completed or the number of session contacts. This kind of research may shed additional light on the effects of treatment dosage and may help to identify the precise dosage levels needed to have an impact on different types of clients.

Taken together, the analyses conducted in this study provide important insights into the causes of recidivism by DRC clients and the efficacy of the state's DRC programs. The findings presented here underscore the importance of using risk and needs assessments to guide decisions about supervision and treatment, and they highlight a number of ways in which policy-makers and practitioners may enhance the impact of DRC programming.

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