DEPARTMENT OF CORRECTIONS

Evaluation of the Recovery, Insight, Victorious, Enduring, Realistic, Self-Care (RIVERS) Substance Use Disorder Treatment Program

June 2022

The Minnesota Department of Corrections (DOC) recently completed an evaluation of the Recovery, Insight, Victorious, Enduring, Realistic, Self-Care (RIVERS) substance use disorder (SUD) treatment program offered at MCF-St. Cloud. The RIVERS program is a short-term therapeutic community (TC)-based program that targets higher custody individuals serving relatively short periods of incarceration. This evaluation assessed the effects of participation in the RIVERS program on four types of recidivism; supervised release revocation, rearrest, reconviction, and admission to prison for a new offense. Program participants were released over the years 2014 to 2019. Recidivism events were tracked through the end of May 2020, allowing for at least one year of follow-up time for all study participants.

Key Findings

- Participation in the RIVERS program significantly reduced three out of four measures of recidivism:
  - 20 percent for rearrest
  - 27 percent for reconviction
  - 27 percent for new offense reincarceration
- Treatment exposure was a significant factor when determining the effectiveness of the RIVERS program. A medium range of treatment dosage (301 to 400 treatment hours, or approximately 4 to 5 months of treatment) significantly reduced the risk of all four measures of recidivism, relative to no treatment:
  - 28 percent for supervised release revocation
  - 21 percent for rearrest
  - 34 percent for reconviction
  - 35 percent for new offense reincarceration
- The lowest and highest categories of treatment dosage did not significantly impact most or any of the four measures of recidivism.

Most people behind bars struggle with substance use disorders (SUDs), and most individuals exit prison without participating in SUD treatment. This happens despite the fact that several decades of research have established that well-designed, evidence-based SUD treatment programs reduce the likelihood of recidivism.

This treatment gap likely exists because SUD treatment is costly and time consuming. Currently, the Minnesota Department of Corrections (MnDOC) has the capacity to serve only a small fraction of the individuals diagnosed with SUDs. The average SUD treatment program at MnDOC lasts for seven months. After going through the intake process and waiting in the existing queue for treatment, many individuals do not have enough time to complete treatment.

The RIVERS treatment program began at MCF-St. Cloud in 2014. The RIVERS program is based on a TC model but is designed to last approximately four to six months, making it shorter than similar programs. This program was implemented at the male intake facility so that it could target individuals serving relatively short periods of incarceration as they entered prison. Another unique feature of this program is that it is geared towards individuals in close custody. Most SUD treatment programs offered by the MnDOC are at minimum- and medium-security facilities.

The RIVERS treatment program has several features that make it evidence-based, including but not limited to the following:

- Targeting high-risk individuals
- Use of the TC model
- A cognitive-behavioral approach
- Small groups, consisting of no more than 12 individuals
- Treating multiple criminogenic needs
- Availability of aftercare and release planning

This study used a retrospective quasi-experimental design to evaluate the effectiveness of the RIVERS treatment program at reducing recidivism. Recidivism outcomes for individuals who participated in the program were compared with outcomes for a matched set of individuals who were diagnosed with a SUD but did not participate in any treatment while incarcerated. Members of the treatment and control groups were released from Minnesota state prisons overs the years 2014 to 2019. Because RIVERS is currently offered only to male inmates, the entire sample is male.

There were 443 RIVERS participants released from prison during the study period. During that same five-year period, 5,516 similarly situated males who were diagnosed with a SUD left prison without treatment. The latter group is the pool from which the control group was selected. Propensity score matching was used to match RIVERS program participants to non-participants. Several factors that predict the likelihood of selection into the RIVERS program and impact the risk of recidivism were used to match participants and non-participants.

Recidivism Results

Table 1 displays one-year recidivism rates for the 351 matched RIVERS program participants, the matched non-participants, as well as the pool from which the control group was selected. Also displayed are recidivism rates for individuals who successfully completed the RIVERS program and individuals who failed out of the program. For all four measures of recidivism, RIVERS program participants had lower rates of recidivism than the matched control

group. A comparison of means between these two groups (not displayed) revealed that these differences were significant for new arrests and new prison admissions.

Table 1. One-Year Recidivism Rates for RIVERS SUD Treatment Participants and Comparison Groups

Recidivism Type	*RIVERS Participants*	*Matched Comparison*	*RIVERS Completers*	*RIVERS Failures*	*Comparison Pool*
Supervision Revocation	32.8%	34.5%	32.3%	34.8%	28.3%
New Arrest	46.4%	56.1%	45.7%	49.3%	40.7%
New Felony Conviction	20.8%	23.4%	21.3%	18.8%	15.9%
New Prison Admission	7.7%	13.4%	7.4%	8.7%	6.2%
N	351	351	282	69	5,516

Individuals who completed the RIVERS program had slightly lower rates of recidivism, except for the rate of new felony convictions, which was slightly higher than the rate for all RIVERS program participants. Individuals who failed or dropped out of the RIVERS program had higher recidivism rates, except for rates of new felony convictions, which was lower than the rate for successful RIVERS program completers.

Multivariate analyses that controlled for selection into the RIVERS program as well as release location and post-release supervision revealed that participation in the RIVERS program significantly reduced the risk of rearrest, reconviction, and admission to prison for a new offense. Additional analyses found that successful completion of the RIVERS program significantly reduced three out of four measures of recidivism, while unsuccessful participation did not significantly reduce the risk of recidivism relative to non-participation.

An analysis of treatment exposure revealed that participation in the RIVERS program for approximately four to five months consistently and significantly reduced all four measures of recidivism. Conversely, participation in the program for one to three months, five to seven months, or more than seven months did not significantly impact most or any of the four measures of recidivism, relative to individuals who did not participate in any SUD treatment.

Summary

The results from this study are consistent with several other studies and meta-analyses demonstrating that evidence-based correctional SUD treatment programs can significantly reduce the likelihood of recidivism. Also consistent with prior research, the highest level of treatment dosage did not translate to the highest level of effectiveness. Individuals who participated in the program for approximately four to five months had the best recidivism outcomes. The results suggest that evidence-based TC treatment programs can be effectively delivered in a shorter amount of time than traditional TC programs.

This study has implications for how treatment could be administered in prison facilities. By offering shorter programs that are four to six months in length, more individuals could participate in treatment. Moreover, individuals serving relatively short periods of incarceration could also be served. One group is individuals who serve short terms of incarceration are supervised release violators. Over the past decade, supervised release revocations have accounted for 30 to 35 percent of annual prison admissions in Minnesota. Once revoked, these

individuals serve an average of six months in prison. Given their relatively short periods of incarceration, this segment of the incarcerated population is not offered much in terms of programming. However, it is possible that many of these incarcerated individuals could successfully complete short-term treatment, such as the RIVERS program.

Given the bleak employment and economic circumstances encountered by many inmates both prior to and after incarceration, SUD treatment is out of reach for many of these individuals outside of prison. Time spent in prison might be an incarcerated individual's only opportunity to participate in SUD treatment. By offering shorter-term SUD treatment programs, more incarcerated individuals could participate in treatment. Given the magnitude of the current treatment gap, it is also likely that more investment is needed to increase the capacity of prison-based SUD treatment programs. However, increasing treatment capacity should not be done at the cost of program quality. This research has demonstrated that programs can be shortened without shedding the evidence-based features that make these program effective.

Evaluation of the Recovery, Insight, Victorious, Enduring, Realistic, Self-Care (RIVERS) Substance Use Disorder Treatment Program

Author
Valerie A. Clark, Ph.D.
Minnesota Department of Corrections
Research Analyst Supervisor, Senior
Email: valerie.clark@state.mn.us
Phone: 651-361-7200

1450 Energy Park Drive, Suite 200
St. Paul, Minnesota 55108-5219
651/361-7200
TTY 800/627-3529
https://mn.gov/doc
June 2022

Abstract

Most people behind bars suffer from substance use disorders (SUDs), but very few of them participate in treatment prior to leaving prison. Minnesota implemented a shorter-term therapeutic community-based treatment program to target higher custody individuals serving relatively short terms of incarceration. The purpose of this research is to determine whether this program reduced the likelihood of recidivism. This study used propensity score matching to compare 351 men who participated in the short-term SUD treatment program to 351 men who left prison without participating in any treatment. Cox regression was used to predict four different types of recidivism. This research found that participation in the short-term program significantly reduced the likelihood of three out of four measures of recidivism. A medium level of treatment exposure (four to five months) significantly reduced the likelihood of all four types of recidivism relative to individuals who did not participate in any treatment. This research contributes to a growing body of evidence showing that evidence-based SUD treatment programs do not need to be long to be effective. By reducing the length of treatment, prisons can increase their treatment capacity, ensuring that fewer individuals leave prison without treatment.

Introduction

Most people behind bars struggle with substance use disorders (SUDs). Nationally, 58% of state prison inmates and 63% of sentenced jail inmates have an abusive or dependent relationship with alcohol or drugs (Bronson et al., 2017). Alcohol and drugs play a role in the time served by most people in federal, state, and local correctional facilities, regardless of the offense each person is arrested for or convicted of (National Center on Addiction and Substance Abuse, 2010). For example, 37% of persons in prisons and jails in 2006 were serving time for a violent offense; alcohol or drugs were involved in more than three-quarters of those offenses. That is, the arrested or convicted person had a diagnosed SUD, was under the influence of alcohol or drugs at the time of the offense, and/or was committing the offense in the pursuit of substances.

Treating SUDs in incarcerated populations is important for two primary reasons: (1) public health, and (2) public safety (Chandler et al., 2009). First, addiction to alcohol and drugs is associated with a myriad of health problems, including but not limited to cardiovascular disease, respiratory problems, liver disease, and mental health issues (National Institute on Drug Abuse, 2020). Treatment can improve the health and quality of life for incarcerated persons afflicted with SUDs, including the prevention of premature death (Chang et al., 2015). Based on a sample of Washington State prisoners released over a four-year period, Binswanger et al. (2007) found that alcohol or drugs overdose was the leading cause of premature death, especially in the first two weeks after release.

Second, substance abuse and dependence leave released prisoners at greater risk of recidivism (e.g., Dowden & Brown, 2002; Laub & Sampson, 2003; Magill & Ray, 2009; Maruna, 2001), while correctional SUD treatment programs reduce the likelihood of recidivism

(Bahr et al., 2012; Belenko et al., 2013; Dutra et al., 2008; Mitchell et al., 2007). Multiple evaluations of correctional SUD treatment programs have demonstrated that well-designed, evidence-based treatment programs can have modest, yet significant recidivism reduction benefits (e.g., Duwe, 2010; Hall et al., 2004; Welsh & Zajac, 2013). A review of what it means to be well-designed and evidence-based is provided in the next section.

However, most incarcerated individuals with diagnosed SUDs do not participate in treatment programs. Nationally, only 11% of jail and prison inmates with diagnosed SUDs participate in treatment (National Center on Addiction and Substance Abuse, 2010). In Minnesota – the site of the present study – more than 3,500 incarcerated individuals are directed to treatment each year, but only approximately 1,600 enter treatment (Minnesota Department of Corrections, 2019). Much like all evidence-based prison programs, SUD treatment programs are reaching a stagnant or shrinking proportion of inmates (Duwe & Clark, 2017; Lynch & Sabol, 2001; Mears et al., 2002). A study of releases from Minnesota prisons over the years 2003 to 2011 revealed that just under 11% of individuals exiting prisons had participated in SUD treatment (Duwe & Clark, 2017).

There are likely several reasons for this treatment gap, including the fact that residential SUD treatment is staff-intensive, expensive, and lengthy. Residential treatment requires several highly skilled treatment staff. In Minnesota, every 100 treatment spots require 11 licensed drug and alcohol counselors, two clinical supervisors, an administrative assistant, and several security staff (Minnesota Department of Corrections, 2019). These staffing needs come at a great cost; the 1,051 treatment spots offered in Minnesota's prisons come at a cost of nearly $11 million annually.

Residential SUD treatment can also be lengthy, making it difficult to get individuals through treatment while they are incarcerated. Among incarcerated persons who have successfully completed SUD treatment in Minnesota prisons, programs ranged from one to 14 months, with an average duration of six months. Treatment via therapeutic communities (TCs) often lasts between six and 12 months. Not including individuals revoked from supervision for technical offenses or individuals held for life without the possibility of release, persons incarcerated in Minnesota prisons are held for an average of 19 months. After going through the intake process and waiting in the existing queue for SUD treatment, many incarcerated individuals end up leaving prison without treatment.

However, previous research has found that treatment programs do not have to be long to be effective. In an evaluation of the Minnesota Department of Corrections' (MnDOC) residential SUD programs, Duwe (2010) found that short- and medium-term treatment programs (i.e., programs that were 90 or 180 days in length, respectively) significantly reduced the risk of recidivism, while year-long programs did not have a significant effect on recidivism.

In light of this evidence, the MnDOC has moved to shorten the average length of SUD treatment programs. As part of this effort, the Recovery, Insight, Victorious, Enduring, Realistic, Self-Care (RIVERS) SUD treatment program began at Minnesota Correctional Facility- (MCF) St. Cloud in 2014. The RIVERS program is based on a TC model but is designed to last approximately four to six months, making it shorter than average TC programs. This program was implemented at the MnDOC's male intake facility so that it could target individuals serving relatively short periods of incarceration as they entered prison. Another unique feature of this program is that it is available to individuals in "close" custody, the second highest level of custody at the MnDOC. Most SUD treatment programs offered by the MnDOC are at minimum-

and medium-security facilities. To be eligible for RIVERS, individuals do not have to be classified for close custody. Rather, having this program at a higher custody facility provides the opportunity for close custody individuals to participate in treatment.

The purpose of this research is to determine whether the RIVERS program – a relatively short TC-based program that targets individuals who would normally exit prison without treatment – reduces the likelihood of recidivism. This study also examines the effects of this program based on dosage – the approximate number of hours spent in treatment – on recidivism. In the following sections we will first review prior research on effective correctional programs, followed by a description of the RIVERS program. Next, the data and methods used to evaluate this program will be described, followed by results, and the conclusions drawn from this research.

Effective Correctional Programs

As incarceration rates surged in the late 1980s, corrections administrators began to realize the over-sized role drugs play in prison populations (Prendergast et al., 2003). In the decades that followed, drug and alcohol abuse treatment programs became a common feature of federal and state prisons. By 2005, three-quarters of all prisons offered SUD treatment programs (Stephan, 2008).

While the number of SUD treatment programs grew, so too did our understanding of what makes correctional programs effective at reducing recidivism. The "principles of effective correctional treatment" laid out by Andrews et al. (1990) informed the standard for rehabilitative programming. The core of the *principles* is the Risk-Need-Responsivity (R-N-R) model. According to the risk principle, individuals involved in the criminal justice system should be assessed for risk of recidivism using validated, reliable, and normed risk assessment tools

(Andrews & Bonta, 2010). More intensive programs should be reserved for individuals who are rated as higher risk to reoffend (Lowenkamp & Latessa, 2005). Program intensity is generally measured in terms of duration and treatment hours.

The risk principle does not endorse an unlimited amount of treatment hours, even for the highest risk individuals. Prior research has demonstrated that there are diminishing returns in recidivism reduction effects as treatment hours increase for medium- and high-risk individuals (Makarios et al., 2014; Wexler, Falkin, & Lipton, 1990). The Evidence-Based Correctional Program Checklist (an assessment tool used to determine how closely correctional programs adhere to the *principles*) describes optimal treatment length as between three and nine months. However, research on appropriate dosage levels is considered incomplete and ongoing, and the precise amount of treatment required for any level of risk is currently unclear (Duriez et al., 2018).

The need principle holds that dynamic characteristics or traits that place individuals at higher risk to reoffend (i.e., criminogenic needs) should be identified and targeted for change via programs and other forms of intervention (Andrews & Bonta, 2010). Substance use disorders are considered one of the "central eight" criminogenic needs, of which seven are dynamic (Duriez et al., 2018; Smith et al., 2009). The other six dynamic central criminogenic needs include antisocial cognition, antisocial associates, antisocial personality, family discord, education or employment limitations, and lack of prosocial hobbies or interests. Ideal programs target more than just one of these needs (Andrews, 2000).

Finally, the responsivity principle requires that interventions have features that can induce change in clients, and that interventions are matched to the preferred learning styles of clients (Gendreau, 1996). While cognitive-behavioral therapies (CBTs) are not appropriate for

everyone involved in the criminal justice system, a large body of research has established that CBTs have features needed to effect change in clients (e.g., Dutra et al., 2008; Magill & Ray, 2009). These features include cognitive restructuring, role playing, modeling, graduated practice, use of reinforcements, and practice of skills outside of therapeutic sessions, among other techniques (Andrews et al., 1990).

Several individual studies and meta-analyses have affirmed that CBTs are among the most reliably effective forms of correctional interventions (Andrews & Bonta, 2010; Landenberger & Lipsey, 2005; Nesovic, 2003; Smith et al., 2009), including evaluations of CBT programs specifically geared toward treating SUDs (Budney et al., 2006; Carroll et al., 2006; Easton et al., 2007; Hall et al., 2004; Kadden et al., 2007; Pelissier et al., 2001; Rawson et al., 2006). While this research is promising, it is worth noting that much of it is dated, having been conducted in the 1980s and 1990s (Byrne, 2020; Duwe, 2017). Moreover, Landenberger and Lipsey's (2005) meta-analysis revealed that the absolute difference in recidivism is ten percent between treatment and control groups. CBT programs are not a panacea for mass incarceration or stubbornly high recidivism rates, but these programs can lower the risk of reoffending.

Drug and alcohol treatment programs that adhere closely to the *principles* are the most effective at inducing desistance from alcohol and drugs as well as reducing the likelihood of recidivism (Bahr et al., 2012). Besides adherence to the R-N-R model and use of CBT as the mode of treatment, another principle of effective programming often found in effective SUD treatment programs is aftercare (Inciardi et al., 2004; Mitchell et al., 2007; Pearson & Lipton, 1999). That is, SUD treatment programs that plan for follow-up care and provide resources to clients so that they can maintain their sobriety after they have been discharged from

treatment are the most successful at reducing recidivism. Ideally, aftercare should follow individuals who have completed treatment from the institution into the community (Andrews, 2000; Listwan et al., 2006).

One final common feature of prison-based SUD treatment programs is use of the therapeutic community (TC) model (e.g., Bahr et al., 2012; Mitchell et al., 2007). While correctional-based TCs can vary from institution to institution, a consistent feature of these programs is the separation of participants from the general prison population. The purpose of this strategy is to allow participants the ability to focus on treatment and avoid negative influences and stressors that may come from the usual prison environment. Over the course of 6 to 12 months, TC participants are expected to play an active role in the program, including holding peers accountable when they violate rules, encouraging peers as they make progress in the program, engaging in group sessions, facilitating groups, and completing chores. TC programs usually include schedules that devote most of the day to therapeutic or rehabilitative programming, which is not only limited to treatment of SUDs. TC participants may also be required to attend educational programming, work, parenting classes, recreational activities, or programming focused on general antisocial cognition. Because SUDs are viewed as just one manifestation of a general personality disorder (Patenaude & Laufersweiller-Dwyer, 2002), TC participants are encouraged or required to attend a variety of programming. In other words, it is not assumed that a SUD is the only issue preventing participants from leading pro-social and conventional lifestyles.

Over the past two decades, incarceration-based TCs have been evaluated across multiple prison systems, including California (Hall et al., 2004; Prendergast et al., 2004; Zhang et al., 2011), Pennsylvania (Welsh, 2007; Welsh & Zajac, 2013), Minnesota (Duwe, 2010), and

Israel (Haviv & Hasisi, 2019). With one exception (Zhang et al., 2011), all these evaluations have found that participation in TC treatment programs significantly reduced the likelihood of recidivism. Based on a meta-analysis of 30 different evaluations of incarceration-based TC programs, Mitchell et al. (2007) found that TCs consistently reduced the likelihood of recidivism, which held true for both male and female participants, as well as persons convicted of violent and nonviolent offenses. Moreover, the recidivism reduction benefits of TCs persisted regardless of the methodological rigor of the individual evaluations.

While several studies have shown that TC-based treatment programs can reduce the likelihood of recidivism, it is important not to overstate the absolute impact of these programs. Consistent with most prison-based treatment programs, the effect sizes of TC-based SUD treatment programs are generally small to modest in size. For example, Duwe's (2010) evaluation of these programs in Minnesota found recidivism differences of 4 to 6% between the treated and untreated groups. Welsh's (2007) evaluation of TC programs in Pennsylvania revealed differences in reincarceration rates between the treatment and control groups of less than 9%.

Past meta-analyses on correctional SUD treatment programs also revealed that there are few methodically rigorous studies of correctional SUD treatment programs. Of the 30 studies reviewed by Pearson and Lipton's (1999) meta-analysis of early evaluations of TCs, nearly half were considered poor methodological quality. Of the 30 TC evaluations reviewed by Mitchell et al. (2007), most were rated as either "weak" or "standard" quasi-experimental designs, meaning that selection bias may have undermined the results. The present study attempts to overcome the limitations of many of the previous evaluations by using propensity score matching (PSM) to reduce selection bias and create treatment and control group participants are

comparable on several key variables. The PSM process will be described in more detail in the Methods section.

The RIVERS Treatment Program

Upon admission to the MnDOC, persons serving at least 120 days of incarceration and all persons convicted of felony-level driving under the influence (DUI) are assessed for a SUD by a licensed drug and alcohol counselor. In recent years, about 90% of incarcerated individuals are diagnosed with a SUD (Minnesota Department of Corrections, 2019). Based on the severity and extent of the disorder, the assessor determines whether the individual is high or moderate need of treatment.

Given that demand for treatment far outpaces capacity, the MnDOC has had to devise a strategy to determine which incarcerated individuals should be prioritized for treatment. This strategy has varied over the years, but in recent years it has been primarily determined by recidivism risk (currently measured by the Minnesota Screening Tool Assessing Recidivism Risk [MnSTARR] [Duwe, 2014]) and incarceration time. Individuals rated as high- or very-high risk on the MnSTARR and who are not serving lengthy periods of incarceration are prioritized for treatment.

The RIVERS program is offered only at MCF-St. Cloud, which is the MnDOC's male intake facility. The MnDOC has four levels of custody, ranging from minimum to maximum. MCF-St. Cloud is a close custody facility, which is the second highest level of custody. Of the 1,051 treatment spots currently available at the MnDOC, less than 11% are located in close-custody facilities (Minnesota Department of Corrections, 2019), leaving individuals classified at this higher level of custody less likely to receive treatment. While the RIVERS program is

offered at a close custody facility, it is still open to individuals of all custody levels. As the MnDOC's sole male intake facility, it does house individuals of all custody levels.

When selecting participants, RIVERS staff look for inmates who meet the following criteria: (a) high or moderate need for treatment, with preference given to people considered higher priority; (b) 5 to 7 months remaining before scheduled release from custody; (c) classified at close or medium custody[1]; and (d) free from disciplinary problems for at least three months. RIVERS staff will consider individuals who do not meet the above criteria on a case-by-case basis. Persons who are considered high need and high priority for treatment but do not have enough incarceration time left to complete other programs are given the highest consideration for admission to RIVERS. This program does not admit individuals serving time for technical violations or supervision revocations; all participants have been admitted to the MnDOC for a new offense conviction.

After selection into the program, participants are moved into the RIVERS housing unit. This unit has 46 spots, of which 4 are reserved for pre-treatment or aftercare. New participants are provided with an orientation packet; more experienced program participants review the packet with new participants. This packet includes several items, including but not limited to the treatment manual, group rules, weekly schedule, and job responsibilities. This program uses a cognitive-behavioral curriculum developed in collaboration by the MnDOC and the Hazelden Foundation ("A New Direction"). The curriculum was developed specifically for justice-involved men. While the program is designed to last 4 to 6 months, the actual length of treatment depends on the participant's progress in the program.

[1] The Minnesota Department of Corrections has a 5-point classification system, with 1 indicating the lowest custody classification and 5 indicating the highest custody classification. Individuals who were rated as a 3 or 4 on this scale were targeted for inclusion in RIVERS.

Within the first week of admission a therapist conducts an intake interview with the new participant. During this interview, the therapist and client review the treatment agreement and the client's rights and responsibilities in treatment, and a treatment plan is established. The therapist conducts a comprehensive interview, collecting information which will be used for monthly re-assessments.

Throughout each week of the program, participants attend morning and afternoon group therapy sessions, which have between 8 and 12 participants. During these sessions, the groups address issues related to substance use and general antisocial behavior, develop and practice interpersonal skills, work on relapse prevention, and they learn how to develop and work toward goals.

In addition to these primary groups, participants can engage in other groups and activities throughout the week, depending on their individuals needs. These groups and activities include educational programming, recreation, and groups focused on certain activities (e.g., thinking reports, accountability, release and reintegration). Once a month, participants can invite a family member or other supportive person to a group. Overall, participants engage in about 15 to 20 hours of evidence-based programming targeted toward various criminogenic needs each week.

Approximately two to three months prior to release, program staff begin to plan for the participant's discharge from the program. Whenever possible, participants are kept in the RIVERS program living unit until release to the community. If that is not possible, they are moved to a living unit or facility that best meets their needs, including an aftercare program at

a different facility. They may also be referred to a treatment or aftercare program in the community.[2]

Based on the information above, the RIVERS program appears to adhere closely to the *principles,* including the use of a CBT approach, treating multiple criminogenic needs, and incorporating aftercare into the program, among other features. The key difference between this program and other TC-based programs is that it is designed to be slightly shorter in duration.

Data and Method

This study used a retrospective quasi-experimental design to evaluate the effectiveness of the RIVERS treatment program at reducing recidivism. Recidivism outcomes for individuals who participated in the program were compared with outcomes for a matched set of individuals who were diagnosed with a SUD but did not participate in any SUD treatment while incarcerated. Members of the treatment and control groups were released from Minnesota state prisons overs the years 2014 to 2019. Because RIVERS is currently offered only to male inmates, the entire sample is male.

There were 443 RIVERS participants released from prison during the study period. During that same five-year period, 5,516 similarly situated males who were diagnosed with SUDs left prison without treatment.[3] The latter group is the pool from which the control group

[2] While aftercare is recommended for all RIVERS participants, it was not tracked as part of the program. Thus, it is not possible to determine which participants received aftercare, regardless of whether it was in the facility or in the community. However, we do know that slightly more than half of RIVERS participants remained in the RIVERS housing unit until release or just prior to release.

[3] The comparison pool includes males who were committed to prison for new offenses, were rated as high or moderate need for treatment, and stayed in prison for at least five months, but exited prison without participating in treatment.

was selected. The process used for matching treatment and control group members will be described in more detail later in this section.

Dependent Variables

The outcome examined in this research was recidivism, which was captured in four ways: (1) supervised release revocations, (2) new arrests, (3) felony reconvictions, and (4) readmissions to prison for new offenses. Recidivism events were tracked through the end of May 2020, which allowed for at least one year of follow-up time for all study participants. The average amount of follow-up time for all the individuals included in the sample was 44 months (3.6 years), ranging from 12 to 71 months.

By measuring recidivism in four different ways, this study examined an array of recidivism behaviors. Supervised release revocations capture both rule- and law-violating behaviors, and account for more than a third of annual admissions to Minnesota prisons (Minnesota Department of Corrections, 2020). Abstinence from alcohol and drugs is a standard condition of supervision, and failed drug and alcohol tests account for a large proportion of revocations (Hicks et al., 2020; Minnesota Department of Corrections, 2009). Thus, including supervision revocations as a measure of recidivism is especially pertinent when examining the effectives of SUD treatment.

Arrests can represent a variety of law-breaking behaviors, from minor to very serious, that have not been proven in court. Felony reconvictions include only the most serious law violations that have been proven in court. According to data from recent years, thirty-seven percent of individuals released from Minnesota prisons will be convicted of a new felony within three years (Minnesota Department of Corrections, 2021). Finally, admissions to prison for new offenses capture only the most serious felony convictions. Nearly 25% of all felony

convictions in Minnesota will result in a prison sentence (Minnesota Sentencing Guidelines Commission, 2020). A quarter of individuals released from Minnesota prisons will reenter prison within three years for a new offense (Minnesota Department of Corrections, 2021).

Survival analysis (Cox regression) was used to estimate the impact of RIVERS program participation on recidivism. Cox regression was the preferred method for this analysis because it makes full use of the available time and status data. This type of regression determines whether recidivism events occurred, how soon after release they happened, and which variables impacted these events. Recidivism events are binary, simply indicating whether the recidivism event occurred during the follow-up period. Time is measured from the date of release to either the recidivism event or to the end of the follow-up period (May 31st, 2020) for individuals who did not reoffend. To accurately account for time for rearrests, reconvictions, and new offense admissions, any time spent in prison for a supervised release violation was subtracted from the time for those measures.

Independent Variables

Because the purpose of this study is to determine whether participation in the RIVERS treatment program reduced the likelihood of recidivism, participation in RIVERS was the primary independent variable. Participation in RIVERS was measured using a binary indicator, in which RIVERS participants were assigned a value of "1" and non-participants were assigned a value of "0." In separate analyses we also examined whether successful completion of the RIVERS program provided a greater recidivism reduction advantage. Eighty percent of matched RIVERS participants successfully completed the program.

Finally, in a third set of analyses, we examined the effect of treatment dosage. Dosage was measured in a series of four binary variables: low (0 to 300 treatment hours), medium (301

to 400 treatment hours), high (401 to 600 treatment hours), and very high (above 600 treatment hours). The matched set of individuals who did not receive treatment served as the comparison group in these analyses. Approximately 21% of participants fell in the low dosage category, 56% were medium, 11% were high, and 13% were very high.

Several other variables that affected selection into the RIVERS program and recidivism outcomes were employed in the matching procedures and in the Cox regression analyses predicting recidivism. All these variables were derived from the MnDOC's Corrections Operations Management System (COMS). These variables included age, race and ethnicity, and type of offense, among several other measures described in Table 1. There were some variables that are associated with recidivism, but occur at the time of release from incarceration, and therefore do not impact selection into SUD treatment. These variables included whether the individual was released to the Minneapolis-St. Paul metropolitan area and the level of supervision they were released to. These measures were excluded from the matching procedure but were included in the Cox regression models that predicted recidivism outcomes.

Because MnSTARR scores play a role in determining treatment priority, we wanted to include this measure in the matching process. However, the MnSTARR was not fully implemented at the start of the study period, and MnSTARR scores were not available for everyone in the treatment or control groups. However, we used several variables included in or related to the MnSTARR, including age at the time of release, education level, prior prison admissions, institutional misconduct (discipline convictions), and whether the individual had been visited while in prison.

Table 1. Logistic Regression Model for RIVERS SUD Treatment Program Selection

Predictor	*Predictor Description*	*Odds Ratio*	*Standard Error*
Age at Release	Age (measured in years) at date of release from prison	0.970***	0.006
Racial or Ethnic Minority	Racial or ethnic minority = 1; white/non-Hispanic = 0	0.636***	0.107
Secondary Degree	Has a secondary degree or higher at time of release = 1; less than secondary degree = 0	1.209	0.134
Prior Prison Admissions	Number of prior prison admissions	1.350***	0.030
Type of Offense	Non-sexual person offense = 0		
Property Offense	Property offense = 1; non-property offense = 0	0.439***	0.169
Drug Offense	Drug offense = 1; non-drug offense = 0	0.532***	0.126
Sex Offense	Sex offense = 1; non-sex offense = 0	0.015***	1.003
DWI Offense	Felony DWI offense = 1; non-felony DWI offense = 0	0.258***	0.266
Other Offense	Other offense = 1; all other offenses = 0	0.386***	0.184
High Treatment Need	Rated high need for SUD treatment = 1; Rated moderate need for treatment = 0	4.356***	0.341
Prison Discipline	Number of discipline convictions in prison during current term	1.074***	0.014
Visitation	Was visited in prison during current term= 1; was not visited during current term= 0	1.150	0.107
Length of stay	Number of months between prison admission and release dates	0.945***	0.007
Constant		0.045***	0.415
N		14,897	
Log likelihood		3549.84	
Nagelkerke R^2		0.123	

*** $p < .001$
$n = 5,959$

PSM

This study used PSM to match individuals who participated in the RIVERS program to individuals diagnosed with a SUD who did not participate in the program. PSM is a process by which, first, logistic regression is used to estimate the propensity to enter the RIVERS program for all eligible persons (Rosenbaum & Rubin, 1985). In the logistic regression analysis presented in Table 1, RIVERS participation was the dependent variable (0 = no SUD treatment; 1 = RIVERS participation), and several variables thought to be related to selection into the RIVERS program were used as independent variables.

The odds ratios displayed in Table 1 reveal that treatment need had the largest impact on selection into the RIVERS program (odds ratio = 4.356, p value < .001). Type of offense also

significantly impacted selection; relative to individuals convicted of person offenses, individuals convicted of sexual offenses were much less likely to participate in the RIVERS program (odds ratio = 0.015, p value < .001). Several other variables significantly impacted selection into the RIVERS program, including age, race and ethnicity, prior prison admissions, institutional discipline, and length of stay.

The propensity scores produced by the analysis for everyone in the sample were then used to match RIVERS participants to non-participants. A "greedy" without replacement matching procedure was used to match RIVERS participants with non-participants. Individuals were matched to their "nearest neighbor" using a caliper of 0.10. Matches were found for nearly 80% of RIVERS participants, resulting in a sample of 351 RIVERS participants and 351 non-participants.[4]

Based on the results presented in , the matching process created balanced treatment and control groups, whose primary difference is that one group participated in the RIVERS program and the other group did not. Table 2 contains means for all the variables used in the logistic regression model prior to and after matching, as well as p values from tests of significance that compared means between the treatment and control groups. There is also a measure of bias (Rosenbaum & Rubin, 1985) computed using the following formula:

$$\text{Bias} = \frac{100(\bar{X}_t - \bar{X}_c)}{\sqrt{\frac{(S_t^2 + S_c^2)}{2}}}$$

This equation produced a standardized mean difference between the treatment and control groups for each variable. In the equation, $\bar{X}_t$ and S_t^2 were the sample mean and variance for RIVERS

[4] PSM was also used to exclude individuals who refused treatment along with individual who did not participate in any SUD treatment and matched with treatment refusers using the same process described above. There were 611 treatment refusers removed from the pool of untreated individuals, along with 611 matched individuals.

Table 2. Propensity Score Matching and Covariate Balance for RIVERS SUD Treatment

Variable	*Sample*	*RIVERS Mean*	*Comparison Mean*	*Bias*	*Bias Reduction*	*t test p Value*
Propensity Score	Unmatched	0.17	0.06	86.30		0.000
	Matched	0.14	0.14	7.26	-91.59%	0.336
Age at Release	Unmatched	34.01	33.54	5.05		0.326
	Matched	33.82	34.02	-2.42	-147.92%	0.748
Racial or Ethnic Minority	Unmatched	40.00%	51.15%	-22.62		0.000
	Matched	44.44%	50.71%	-12.56	-44.47%	0.097
Prior Prison Admissions	Unmatched	1.77	0.74	65.50		0.000
	Matched	1.81	2.01	-11.15	-117.02%	0.140
Person offense	Unmatched	54.18%	44.45%	19.53		0.000
	Matched	54.70%	51.28%	6.84	-64.98%	0.365
Property offense	Unmatched	10.38%	12.88%	-7.80		0.127
	Matched	11.68%	13.96%	-6.81	-12.69%	0.367
Drug offense	Unmatched	23.48%	24.66%	-2.77		0.575
	Matched	22.51%	20.80%	4.15	-249.82%	0.583
Sex offense	Unmatched	0.22%	6.30%	-34.55		0.000
	Matched	0.28%	1.14%	-10.16	-70.59%	0.179
DWI offense	Unmatched	3.61%	0.50%	22.00		0.000
	Matched	0.57%	0.28%	4.36	-80.18%	0.564
Other offense	Unmatched	8.13%	11.24%	-10.55		0.043
	Matched	0.10%	12.54%	-7.17	-32.04%	0.343
High treatment need	Unmatched	97.97%	86.44%	44.03		0.000
	Matched	97.44%	94.30%	15.77	-64.18%	0.037
Prison Discipline	Unmatched	2.14	2.51	-6.44		0.166
	Matched	2.05	2.99	-17.76	175.78%	0.019
Visitation	Unmatched	45.00%	49.00%	-8.02		0.145
	Matched	46.00%	47.00%	-2.00	-75.06%	0.453
Length of Stay	Unmatched	11.07	17.31	-38.76		0.000
	Matched	11.57	13.81	-19.25	-50.34%	0.011

Total RIVERS = 443; Total Comparison Group Pool = 5,516; Matched RIVERS = 351; Matched Comparison = 351

participants, while $\bar{X}_c$ and S_c^2 were the sample mean and variance for matched individuals who did not complete any SUD treatment while incarcerated. The treatment and control groups are considered unbalanced if the bias statistic exceeds 20 (Rosenbaum & Rubin, 1985).

Table 2 reveals that PSM reduced bias for most of the measures, except for prison discipline, for which matching increased bias. The control group has a higher number of institutional discipline convictions than the treatment group (2.99 compared to 2.05 convictions, respectively). Also, while the matching procedure greatly reduced the imbalance between the treatment and control groups for the length of stay measure, incarceration time for the treatment group was significantly shorter than the control group's time (11.57 compared to 13.81 months, respectively). However, for all the matching variables, the bias estimate is less than 20.

Results

Table 3 displays one-year recidivism rates for the 351 matched RIVERS program participants, the matched non-participants, as well as the pool from which the control group was selected. Also displayed are recidivism rates for individuals who successfully completed the RIVERS program and individuals who failed out of the program. Approximately 80% of individual who entered RIVERS successfully completed the program. For all four measures of recidivism, RIVERS program participants had lower rates of recidivism than the matched control group. A comparison of means between these two groups (not displayed) revealed that these differences were significant for new arrests and new prison admissions. Individuals who completed the RIVERS program had slightly lower rates of recidivism, except for the rate of new felony convictions, which was slightly higher than the rate for all RIVERS program participants. Individuals who failed or dropped out of the RIVERS program had higher recidivism rates, except for rates of new felony convictions, which was lower than the rate for successful RIVERS program completers.

The recidivism rates displayed in Table 3 indicate that RIVERS program participants, and especially individuals who successfully completed the program, had lower rates of recidivism. However, these rates do not reflect release circumstances. Specifically, the PSM process did not include whether the individual was released to the Minneapolis-St. Paul metropolitan area, or the type of supervision the individual was under when released. Individuals

Table 3. One-Year Recidivism Rates for RIVERS SUD Treatment Participants and Comparison Groups

Recidivism Type	*RIVERS Participants*	*Matched Comparison*	*RIVERS Completers*	*RIVERS Failures*	*Comparison Pool*
Supervision Revocation	32.8%	34.5%	32.3%	34.8%	28.3%
New Arrest	46.4%	56.1%	45.7%	49.3%	40.7%
New Felony Conviction	20.8%	23.4%	21.3%	18.8%	15.9%
New Prison Admission	7.7%	13.4%	7.4%	8.7%	6.2%
N	351	351	282	69	5,516

could be released to standard supervision, intensive supervised release (ISR), or work release.[5] Prior research has found that all these factors influence the likelihood of recidivism (e.g., Clark, 2016). The cox regression models include these measures.

The Cox regression models predicting four different types of recidivism based on RIVERS program participation are displayed in Table 4. Rather than include the 12 variables used in the matching process again, the Cox regression models include the propensity scores, as this covariate captures the variation in the 12 matching variables for each participant (Duwe, 2014; Duwe & McNeeley, 2021). Also included is a binary indicator of RIVERS program participation, as well as an indicator for whether the individual was released to the Minneapolis-St. Paul metropolitan area, and the form of supervision they were released to. Individuals could be released to standard supervision (the reference category), ISR, or work release.

The results displayed in Table 4 reveal that participation in the RIVERS program reduced three out of four measures of recidivism. Participation in RIVERS reduced the hazard for rearrest, reconviction, and new prison admission by 20% to 27%. The hazard ratio for supervision revocations was similar in magnitude to the other measures of recidivism, but it was not significant.

[5] Thirty-nine percent of both the treatment and control groups were released to the Minneapolis-St. Paul metropolitan area. Seventy-four percent of RIVERS participants were released to standard supervision, compared to 72% of control group members. Twenty percent of RIVERS participants were released to ISR, compared to 22% of control group members. Six percent of both RIVERS and control group participants were released to work release.

Table 4. Cox Regression Analyses Predicting Four Types of Recidivism based on Participation in the RIVERS SUD Treatment Program

	Supervision Revocation		*New Arrest*		*New Felony Conviction*		*New Prison Admission*	
	HR	SE	HR	SE	HR	SE	HR	SE
RIVERS Participation	0.873	0.121	0.801**	0.088	0.728**	0.117	0.726*	0.133
Propensity Score	6.906***	0.435	3.442***	0.339	4.835***	0.427	9.826***	0.448
Release to MSP area	1.574***	0.119	1.193*	0.087	1.095	0.115	1.060	0.129
ISR	1.574**	0.141	0.858	0.109	0.907	0.143	0.857	0.160
Work Release	1.435	0.224	0.699*	0.183	0.805	0.254	0.623	0.327

Notes: HR = hazard ratio; SE = Standard Error; MSP = Minneapolis-St. Paul; ISR = intensive supervised release
n = 702
*** $p < .001$; ** $p < .01$; * $p < .05$

The results in Table 4 also indicate that release to the Minneapolis St. Paul metropolitan area increased the risk of recidivism. However, this effect was significant only for the risk of supervision revocation and re-arrest. Relative to standard supervision, release to ISR or work release increased the risk of supervision revocation, but decreased the risk of re-arrest, re-conviction, and admission to prison for a new offense. These findings are consistent with prior research (Clark, 2016). It appears that the higher levels of supervision that come with ISR and work release increased the risk of detection of technical violations, but did not increase the risk of committing new offenses.

The results displayed in Table 5 indicate that successful completion of the RIVERS program provided additional recidivism reduction benefits. Relative to lack of participation in any SUD treatment, successful completion of the RIVERS program significantly reduced the hazard of rearrest, reconviction and new prison admission by 20 to 25%. As was true with the previous set of analyses, the hazard ratio for supervision revocations was not significant, although it did indicate a reduction in hazard.

Table 5. Cox Regression Analyses Predicting Four Types of Recidivism based on Completion or Failure in the RIVERS SUD Treatment Program

	Supervision Revocation		*New Arrest*		*New Felony Conviction*		*New Prison Admission*	
	HR	SE	HR	SE	HR	SE	HR	SE
RIVERS Completion	0.861	0.130	0.803*	0.094	0.761*	0.125	0.746*	0.144
RIVERS Failure	0.920	0.207	0.790	0.156	0.608*	0.222	0.659	0.245
Propensity Score	6.899***	0.435	3.447***	0.339	4.919***	0.428	9.957***	0.449
Release to MSP area	1.568***	0.120	1.193*	0.088	1.104	0.115	1.065	0.129
ISR	1.546**	0.141	0.858	0.109	0.910	0.143	0.859	0.160
Work Release	1.449	0.226	0.697*	0.184	0.783	0.255	0.613	0.329

Notes: HR = hazard ratio; SE = Standard Error; MSP = Minneapolis-St. Paul; ISR = intensive supervised release
n = 702
*** $p < .001$; ** $p < .01$; * $p < .05$

Finally, the results displayed in Table 6 measured the effect of treatment dosage on recidivism. Treatment dosage was measured via the approximate number of hours of participation in the RIVERS program. Individuals who participated in a medium level of treatment exposure (301 to 400 hours) experienced significant recidivism reduction benefits relative to individuals who did not participate in any treatment for all four measures of recidivism. A medium level of treatment exposure significantly reduced the hazard of supervision revocation, rearrest, reconviction, and new prison admission by 21 to 35%. This medium level of treatment exposure translates to 3.8 to 4.8 months in the RIVERS program.

Table 6. Cox Regression Analyses Predicting Four Types of Recidivism based on Treatment Duration in the RIVERS SUD Treatment Program

	Supervision Revocation		*New Arrest*		*New Felony Conviction*		*New Prison Admission*	
	HR	SE	HR	SE	HR	SE	HR	SE
Low (0 to 300 Tx Hours)	1.048	0.195	0.842	0.150	0.658*	0.214	0.620	0.250
Medium (301 to 400 Tx hours)	0.719*	0.155	0.788*	0.107	0.656**	0.150	0.655*	0.176
High (401 to 600 Tx hours)	1.003	0.255	0.747	0.202	0.748	0.267	0.913	0.277
Very High (above 600 Tx hours)	1.105	0.221	0.889	0.175	1.172	0.206	0.974	0.243
Propensity Score	6.318***	0.437	3.357***	0.340	4.645***	0.426	9.575***	0.447
Release to MSP area	1.549***	0.119	1.197*	0.088	1.100	0.115	1.061	0.129
ISR	1.518**	0.141	0.865	0.109	0.903	0.143	0.852	0.160
Work Release	1.440	0.227	0.712	0.185	0.804	0.258	0.595	0.332

Notes: HR = hazard ratio; SE = Standard Error; Tx = Treatment; MSP = Minneapolis-St. Paul; ISR = intensive supervised release
n = 702
*** $p < .001$; ** $p < .01$; * $p < .05$

Again referring to Table 6, a low level of treatment exposure (less than 300 hours) significantly reduced the hazard for new felony convictions by 34%, but did not have significant recidivism reduction benefits for the three other measures of recidivism. The high and very high levels of treatment exposure (401 to 600 hours and above 600 hours, respectively) did not significantly reduce any of the four measures of recidivism. In fact, the hazard ratio for the very high level of treatment exposure indicated an increase in the risk of supervision revocation and new felony conviction, although these effects were not statistically significant.

Conclusion

Consistent with several other studies and meta-analyses of correctional-based SUD treatment, the present study found that participation in a TC-based SUD treatment program with a cognitive-behavioral approach significantly reduced the likelihood of recidivism (e.g., Budney et al., 2006; Carroll et al., 2006; Easton et al., 2007; Hall et al., 2004; Kadden et al., 2007; Mitchell et al., 2007; Pelissier et al., 2001; Rawson et al., 2006). Also consistent with prior research, the highest level of treatment dosage did not translate to the highest level of effectiveness (Duwe, 2010; Makarios et al., 2014). The medium level of dosage was consistently and significantly effective at reducing all forms of recidivism measured in this study. Individuals who participated in the program for approximately four to five months had the best recidivism outcomes. The results suggest that TC-based SUD treatment programs designed based on many of the *principles of effective correctional treatment* can be effectively delivered in a shorter amount of time than traditional TC-based programs.

This study does not come without limitations. Most notably, the matching process and the subsequent analyses rely on observed variables. Unobserved measures are not accounted for in any of the analyses. Participation and successful completion of SUD treatment could be a signal

that individuals are ready to desist from crime (Maruna & Roy, 2007); however, this change in identity cannot be measured or accounted for in the analyses. This study did attempt to account for motivation for treatment by eliminating individuals who were offered treatment but refused to participate, along with individuals who were matched to treatment refusers via PSM.

One measure that was missing from the matching process and analyses was MnSTARR risk levels. Given that risk level is used for treatment prioritization and is significantly associated with recidivism outcomes, this measure would have been a valuable addition to the analyses. Moreover, dosage levels could have been examined based on variations in risk level. MnSTARR risk levels were available for approximately two-thirds of the treatment and control groups. Among individuals who had a MnSTARR score, approximately two-thirds of both the treatment and control groups were rated as high- or very high-risk. This finding, in combination with the fact that higher risk individuals are generally prioritized for treatment indicates that a large proportion of the individuals in the sample were likely high risk.

This study has implications for how treatment could be administered in prison facilities. By offering shorter programs that are four to six months in length, more individuals could participate in treatment. Moreover, individuals serving relatively short periods of incarceration could also be served. One group is individuals who serve short terms of incarceration are supervised release violators. Over the past decade, supervised release revocations have accounted for 30 to 35% of annual prison admissions in Minnesota. Once revoked, these individuals serve an average of six months in prison. Given their relatively short periods of incarceration, this segment of the incarcerated population is not offered much in terms of programming. However, it is possible that many of these incarcerated individuals could successfully complete the RIVERS program.

Given the bleak employment and economic circumstances encountered by many inmates both prior to and after incarceration (e.g., Travis et al., 2001; Visher et al., 2004; Western et al., 2001), SUD treatment is out of reach for many of these individuals outside of prison. Time spent in prison might be an incarcerated individual's only opportunity to participate in SUD treatment. By offering shorter-term SUD treatment programs, more incarcerated individuals could participate in treatment. Given the magnitude of the current treatment gap, it is also likely that more investment is needed to increase the capacity of prison-based SUD treatment programs. However, increasing treatment capacity should not be done at the cost of program quality. This research has demonstrated that programs can be shortened without shedding the evidence-based features that make the program effective.

References

Andrews, D. A. (2000). The Principles of Effective Correctional Programs. In L. Motiuk & R. C. Serin (Eds.), *Compendium 2000 on Effective Correctional Programming* (Vol. 1). Correctional Service of Canada.Andrews, D. A., & Bonta, J. (2010). Rehabilitating criminal justice policy and practice. *Psychology, Public Policy, and Law*, *16*(1), 39–55. https://doi.org/10.1037/a0018362

Andrews, D. A., Zinger, I., Hoge, R. D., Bonta, J., Gendreau, P., & Cullen, F. T. (1990). Does correctional treatment work? A clinically-relevant and psychologically-informed meta-analysis. *Criminology*, *28*(3), 369–404. https://doi.org/10.1111/j.1745-9125.1990.tb01330.x

Austin, P. C. (2017). Double propensity-score adjustment: A solution to design bias or bias due to incomplete matching. *Statistical Methods in Medical Research*, *26*(1), 201–222. https://doi.org/10.1177/0962280214543508

Bahr, S. J., Masters, A. L., & Taylor, B. M. (2012). What works in substance abuse treatment programs for offenders? *The Prison Journal*, *92*(2), 155–174. https://doi.org/10.1177/0032885512438836

Belenko, S., Hiller, M., & Hamilton, L. (2013). Treating substance use disorders in the criminal justice system. *Current Psychiatry Reports*, *15*(11), 414. https://doi.org/10.1007/s11920-013-0414-z

Binswanger, I. A., Stern, M. F., Deyo, R. A., Heagerty, P. J., Cheadle, A., Elmore, J. G., & Koepsell, T. D. (2007). Release from prison—a high risk of death for former inmates. *New England Journal of Medicine*, *356*(2), 157–165. https://doi.org/10.1056/NEJMsa064115

Bronson, J., Stroop, J., Zimmer, S., & Berzofsky, M. (2017). *Drug use, dependence, and abuse among state prisoners and jail inmates, 2007–2009*. United States Department of Justice, Office of Juvenile Justice and Delinquency Prevention.

Budney, A. J., Moore, B. A., Rocha, H. L., & Higgins, S. T. (2006). Clinical trial of abstinence-based vouchers and cognitive-behavioral therapy for cannabis dependence. *Journal of Consulting and Clinical Psychology*, *74*(2), 307–316. https://doi.org/10.1037/0022-006X.74.2.307

Byrne, J. M. (2020). The effectiveness of prison programming: A review of the research literature examining the impact of federal, state, and local inmate programming on post-release recidivism. *Fed. Probation*, *84*, 3.

Carroll, K. M., Easton, C. J., Nich, C., Hunkele, K. A., Neavins, T. M., Sinha, R., & Rounsaville, B. J. (2006). The use of contingency management and motivational/skills-building therapy to treat young adults with marijuana dependence. *Journal of Consulting and Clinical Psychology*, *74*(5), 955–966. https://doi.org/10.1037/0022-006X.74.5.955

Chandler, R. K., Fletcher, B. W., & Volkow, N. D. (2009). Treating drug abuse and addiction in the criminal justice system: Improving public health and safety. *Journal of the American Medical Association*, *301*(2), 183–190. https://doi.org/10.1001/jama.2008.976

Chang, Z., Lichtenstein, P., Larsson, H., & Fazel, S. (2015). Substance use disorders, psychiatric disorders, and mortality after release from prison: A nationwide longitudinal cohort study. *The Lancet Psychiatry*, *2*(5), 422–430. https://doi.org/10.1016/S2215-0366(15)00088-7

Clark, V. A. (2016). Predicting two types of recidivism among newly released prisoners: First addresses as "launch pads" for recidivism or reentry success. *Crime & Delinquency*, *62*(10), 1364–1400. https://doi.org/10.1177/0011128714555760

Dowden, C., & Brown, S. L. (2002). The role of substance abuse factors in predicting recidivism: A meta-analysis. *Psychology, Crime and Law*, *8*(3), 243–264. https://doi.org/10.1080/10683160208401818

Duriez, S. A., Sullivan, C., Latessa, E. J., & Lovins, L. B. (2018). The evolution of correctional program assessment in the age of evidence-based practices. *Corrections: Policy, Practice and Research*, *3*(2), 119–136. https://doi.org/10.1080/23774657.2017.1343104

Dutra, L., Stathopoulou, G., Basden, S. L., Leyro, T. M., Powers, M. B., & Otto, M. W. (2008). A meta-analytic review of psychosocial interventions for substance use disorders. *American Journal of Psychiatry*, *165*(2), 179–187. https://doi.org/10.1176/appi.ajp.2007.06111851

Duwe, G. (2010). Prison-based chemical dependency treatment in Minnesota: An outcome evaluation. *Journal of Experimental Criminology*, *6*(1), 57–81. https://doi.org/10.1007/s11292-010-9090-8

Duwe, G. (2014). The development, validity, and reliability of the Minnesota screening tool assessing recidivism risk (MnSTARR). *Criminal Justice Policy Review*, *25*(5), 579–613. https://doi.org/10.1177/0887403413478821

Duwe, G. (2017). *The use and impact of correctional programming for inmates on pre-and post-release outcomes* (Vol. 48). US Department of Justice, Office of Justice Programs, National Institute of Justice.

Duwe, G., & Clark, V. (2017). The rehabilitative ideal versus the criminogenic reality: The consequences of warehousing prisoners. *Corrections: Policy, Practice and Research*, *2*(1), 41–69. https://doi.org/10.1080/23774657.2016.1240596

Duwe, G., & McNeeley, S. (2021). Just as good as the real thing? The effects of prison video visitation on recidivism. *Crime & Delinquency*, *67*(4), 475–497. https://doi.org/10.1177/0011128720943168

Easton, C. J., Mandel, D. L., Hunkele, K. A., Nich, C., Rounsaville, B. J., & Carroll, K. M. (2007). A Cognitive Behavioral Therapy for Alcohol-Dependent Domestic Violence Offenders: An Integrated Substance Abuse–Domestic Violence Treatment Approach (SADV). *American Journal on Addictions*, *16*(1), 24–31. https://doi.org/10.1080/10550490601077809

Gendreau, P. (1996). The principles of effective intervention with offenders. In A. T. Harland (Ed.), *Choosing correctional options that work: Defining the demand and evaluating the supply*. Sage.

Hall, E. A., Prendergast, M. L., Wellisch, J., Patten, M., & Cao, Y. (2004). Treating drug-abusing women prisoners: An outcomes evaluation of the Forever Free program. *The Prison Journal*, *84*(1), 81–105. https://doi.org/10.1177/0032885503262456

Haviv, N., & Hasisi, B. (2019). Prison addiction program and the role of integrative treatment and program completion on recidivism. *International Journal of Offender Therapy and Comparative Criminology*, *63*(15–16), 2741–2770. https://doi.org/10.1177/0306624X19871650

Hicks, W. D., Holcomb, J. E., Alexander, M. A., & Clodfelter, T. A. (2020). Drug testing and community supervision outcomes. *Criminal Justice and Behavior*, *47*(4), 419–436. https://doi.org/10.1177/0093854819898219

Inciardi, J. A., Martin, S. S., & Butzin, C. A. (2004). Five-year outcomes of therapeutic community treatment of drug-involved offenders after release from prison. *Crime & Delinquency*, *50*(1), 88–107. https://doi.org/10.1177/0011128703258874

Kadden, R. M., Litt, M. D., Kebela-Cormier, E., & Petry, N. M. (2007). Abstinence rates following behavioral treatments for marijuana dependence. *Addictive Behaviors*, *32*(6), 1220–1236. https://doi.org/10.1016/j.addbeh.2006.08.009

Landenberger, N. A., & Lipsey, M. W. (2005). The positive effects of cognitive–behavioral programs for offenders: A meta-analysis of factors associated with effective treatment. *Journal of Experimental Criminology*, *1*, 451–476.

Laub, J., & Sampson, R. (2003). *Shared beginnings, divergent lives: Delinquent boys to age 70*. Harvard University Press.

Listwan, S. J., Cullen, F. T., & Latessa, E. J. (2006). How to Prevent Prisoner Re-Entry Programs from Failing: Insights from evidence-based corrections. *Federal Probation*, *70*, 19–25.

Lowenkamp, C. T., & Latessa, E. J. (2005). *Evaluation of Ohio's CCA funded programs*. University of Cincinnati, Division of Criminal Justice.

Lynch, J. P., & Sabol, W. J. (2001). *Prisoner reentry in perspective: Crime policy report.*: Urban Institute, Justice Policy Center.

Magill, M., & Ray, L. A. (2009). Cognitive-behavioral treatment with adult alcohol and illicit drug users: A meta-analysis of randomized controlled trials. *Journal of Studies on Alcohol and Drugs*, *70*(4), 516–527. https://doi.org/10.15288/jsad.2009.70.516

Makarios, M., Sperber, K., & Latessa, E. J. (2014). Treatment dosage and the risk principle: Refinement and extension. *Journal of Offender Rehabilitation*, *53*(5), 334–350. https://doi.org/10.1080/10509674.2014.922157

Maruna, S. (2001). *Making good: How ex-convicts reform and rebuild their lives*. American Psychological Association.

Maruna, S., & Roy, K. (2007). Amputation or reconstruction? Notes on the concept of "knifing off" and desistance from crime. *Journal of Contemporary Criminal Justice*, *23*(1), 104–124. https://doi.org/10.1177/1043986206298951

Mears, D. P., Lawrence, S., Solomon, A. L., & Waul, M. (2002). Prison-based programming: What it can do and why it is needed. *Corrections Today*, *64*(2), 66–71.

Messina, N., Wish, E., & Nemes, S. (2000). Predictors of treatment outcomes in men and women admitted to a therapeutic community. *The American Journal of Drug and Alcohol Abuse*, *26*(2), 207–227. https://doi.org/10.1081/ADA-100100601

Minnesota Department of Corrections (2009). *review of guidelines for revocation of parole and supervised release: 2009 report to the Minnesota Legislature*. https://mn.gov/doc/assets/ReviewofGuidelinesforParole-ReleaseRevocation2009Report_002_tcm1089-276045.pdf

Minnesota Department of Corrections. (2019). *Substance use disorder treatment in prison*. *Fact Sheet. St*. https://mn.gov/doc/assets/Substance%20Use%20Disorder%20Treatment_tcm1089-413914.pdf

Minnesota Department of Corrections. (2020). *Adult Prison Population Summary*. https://mn.gov/doc/assets/Adult%20Prison%20Population%20Summary%201-1-2020_tcm1089-418232.pdf

Minnesota Department of Corrections. (2021). *Performance Report, 2020*. https://mn.gov/doc/assets/DOC%202020%20Performance%20Report%20%28final%29_tcm1089-466714.pdf

.Minnesota Sentencing Guidelines Commission. (2020). *2019 Sentencing Practices: Annual Summary Statistics for Felony Cases Sentenced in 2019*. https://mn.gov/sentencing-guidelines/assets/2019MSGCAnnualSummaryStatistics_tcm30-457007.pdf

Mitchell, O., Wilson, D. B., & MacKenzie, D. L. (2007). Does incarceration-based drug treatment reduce recidivism? A meta-analytic synthesis of the research. *Journal of Experimental Criminology*, *3*(4), 353–375. https://doi.org/10.1007/s11292-007-9040-2

National Center on Addiction and Substance Abuse. (2010). *Behind bars II: Substance abuse and America's prison population*. Columbia University.

National Institute on Drug Abuse. (2020). *Health Consequences of Drug Misuse*. https://www.drugabuse.gov/drug-topics/health-consequences-drug-misuse/introduction

Nesovic, A. (2003). *Psychometric evaluation of the Correctional Program Assessment Inventory (CPAI)*. Carleton University.

Patenaude, A. L., & Laufersweiller-Dwyer, D. L. (2002). *Arkansas comprehensive substance abuse treatment program: Process evaluation of the modified therapeutic community (tucker unit)*. National Institute of Justice.

Pearson, F. S., & Lipton, D. S. (1999). A meta-analytic review of the effectiveness of corrections-based treatments for drug abuse. *The Prison Journal*, *79*(4), 384–410. https://doi.org/10.1177/0032885599079004003

Pelissier, B., Wallace, S., O'Neil, J. A., Gaes, G. G., Camp, S., Rhodes, W., & Saylor, W. (2001). Federal prison residential drug treatment reduces substance use and arrests after release. *American Journal of Drug and Alcohol Abuse*, *27*(2), 315–337. https://doi.org/10.1081/ADA-100103712

Prendergast, M. L., Hall, E. A., & Wexler, H. K. (2003). Multiple measures of outcome in assessing prison-based drug treatment program. *Journal of Offender Rehabilitation*, *37*(3–4), 65–94. https://doi.org/10.1300/J076v37n03_04

Prendergast, M. L., Hall, E. A., Wexler, H. K., Melnick, G., & Cao, Y. (2004). Amity prison-based therapeutic community: 5-year outcomes. *The Prison Journal*, *84*(1), 36–60. https://doi.org/10.1177/0032885503262454

Rawson, R. A., McCann, M. J., Flammino, F., Shoptaw, S., Miotto, K., Reiber, C., & Ling, W. (2006). A comparison of contingency management and cognitive-behavioral approaches for stimulant-dependent individuals. *Addiction*, *101*(2), 267–274. https://doi.org/10.1111/j.1360-0443.2006.01312.x

Rosenbaum, P. R., & Rubin, D. B. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *The American Statistician*, *39*(1), 33–38.

Sacks, J. Y., McKendrick, K., & Hamilton, Z. (2012). A randomized clinical trial of a therapeutic community treatment for female inmates: Outcomes at 6 and 12 months after prison release. *Journal of Addictive Diseases*, *31*(3), 258–269. https://doi.org/10.1080/10550887.2012.694601

Smith, P., Gendreau, P., & Swartz, K. (2009). Validating the principles of effective intervention: A systematic review of the contributions of meta-analysis in the field of corrections. *Victims and Offenders*, *4*(2), 148–169. https://doi.org/10.1080/15564880802612581

Stephan, J. J. (2008). *Census of state and federal correctional facilities*. Bureau of Justice Statistics. .Travis, J., Solomon, A. L., & Waul, M. (2001). *From prison to home: The dimensions and consequences of prisoner reentry*. Urban Institute, Justice Policy Center.

Visher, C. A., La Vigne, N., & Travis, J. (2004). Returning home: Understanding the challenges of prisoner reentry. In *Maryland pilot study: Findings from Baltimore*. Urban Institute, Justice Policy Center.

Welsh, W. N. (2007). A multisite evaluation of prison-based therapeutic community drug treatment. *Criminal Justice and Behavior*, *34*(11), 1481–1498. https://doi.org/10.1177/0093854807307036

Welsh, W. N., & Zajac, G. (2013). A multisite evaluation of prison-based drug treatment: 4-Year follow-Up results. *Prison Journal*, *93*(3), 251–271. https://doi.org/10.1177/0032885513490265

Western, B., Kling, J. R., & Weiman, D. F. (2001). The labor market consequences of incarceration. *Crime & Delinquency*, *47*(3), 410–427. https://doi.org/10.1177/0011128701047003007

Zhang, S. X., Roberts, R. E., & McCollister, K. E. (2011). Therapeutic community in a California prison: Treatment outcomes after 5 years. *Crime & Delinquency*, *57*(1), 82–101. https://doi.org/10.1177/0011128708327035