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A long-term follow-up evaluation of the Minnesota High Risk Revocation Reduction reentry program

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Abstract

Objectives This study examines the effectiveness of the High Risk Revocation Reduction (HRRR) program, a reentry program designed to reduce recidivism among offenders released from Minnesota state prisons.

Methods Adult male release violators were randomly assigned to a treatment group that received supplemental case planning and access to community service and programs, or to a control group that received standard case management. Survival analysis was used to examine rearrest, reconviction, reincarceration for a new offense, and supervised release revocation.

Results The results of Cox regression models showed that participation in HRRR significantly reduced the risk of rearrest but had no effect on the other measures of recidivism.

Conclusion The results provide limited support for the program, although its effectiveness appeared to decline during the second phase of implementation. HRRR also reduced costs; however, the estimated benefits were not robust across all sensitivity analyses.

Keywords Cost-benefit · Program evaluation · Randomized experimental design · Recidivism · Reentry

Introduction

Because approximately 95% of prison inmates will be released back into the community at some point (Petersilia 2003), there has been a recent national focus on prisoner

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reentry, with an emphasis on multiagency collaboration to offer programs to reduce recidivism (O'Hear 2007). In response, the Second Chance Act (SCA), passed in 2008, provides funds for reentry programs for a variety of services that address common issues faced by high-risk offenders released from state and local correctional facilities (O'Hear 2007). All programs funded by SCA must incorporate elements of evidence-based practices, including the use of actuarial instruments to assess risk and needs and sustained case planning that follows offenders from incarceration into the community (U.S. Department of Justice 2010).

The Minnesota Department of Corrections (MnDOC) was awarded an SCA Adult Demonstration Grant in 2010 for the High Risk Revocation Reduction (HRRR) program, a pilot project with two phases of implementation that operated between 2011 and 2015. HRRR provided individualized transition planning, sustained case management, and services related to housing, employment, transportation, and family relationships for adult male release violators without new prison sentences[1]—those who were released from prison but returned for violating the conditions of supervised release (these include violations of technical conditions such as failure to meet with supervision agents as well as new low-level criminal behavior that would not typically result in a prison sentence). MnDOC chose to target release violators because they account for about one third of prison admissions per year (Minnesota Department of Corrections 2016); therefore, reducing release violations could substantially lower the prison population. In addition, release violators are returned to prison for relatively short stays (an average of six months), so they are often unable to participate in existing rehabilitation programs.

The HRRR program was implemented using an experimental research design to evaluate whether release violators who participated in the program were less likely to recidivate. The initial HRRR evaluation yielded promising recidivism findings (Clark, 2015), suggesting that programs targeting release violators could be an effective method of reducing the prison population. However, the initial evaluation was completed after only the first of two phases of implementation and had a relatively short follow-up period. Therefore, there is still uncertainty regarding its long-term effectiveness, and the success of the program's second phase has not been assessed. To address these issues, the current study conducts an updated outcome evaluation of the HRRR pilot program, examining its impact on four measures of recidivism (i.e., rearrest, reconviction, reincarceration for a new felony, and supervised release revocation) during each of the two phases of implementation and overall. In addition, because it is unknown whether HRRR was a cost-effective method of reducing recidivism, this study also conducts a cost–benefit analysis of the program.

Prior research on prisoner reentry

Obstacles to reentry success

The reentry literature has identified several issues that offenders face when they are released from prison. First, research suggests that obtaining stable housing reduces

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[1] A majority of release violators in Minnesota are returned to prison without a new sentence (89% of release violators who were incarcerated as of July 1, 2017).

recidivism (Roman and Travis 2004; Visher and Courtney 2007); however, releasees often experience problems finding housing on their own, especially since they are excluded from many apartments or communities due to their criminal status (La Vigne et al. 2008). After release from prison, most offenders live with family members, who may not be able to provide long-term accommodations (La Vigne et al. 2004). Due to these issues, released prisoners experience high residential mobility during their first year in the community (Visher and Courtney 2007), and rates of homelessness among releasees have been estimated at 25% or higher (Austin and Irwin 2000).

A second source of difficulty facing prisoners at reentry is obtaining appropriate employment. It is argued that jobs—especially high-quality, stable jobs (Uggen, 1999)—promote desistance from crime by providing prosocial contacts and reinforcing traditional goals and values (Sampson and Laub 1993). In line with these ideas, employment has been found to lower recidivism (La Vigne et al. 2004; Visher and Courtney 2007; Visher et al. 2008). Unfortunately, a majority of releasees are unable to secure stable employment: 65% of male ex-prisoners in Cleveland reported struggling to find a job one year after release (Visher and Courtney 2007). A comprehensive report on employment among parolees in three states showed that only 45% were employed eight months after release. Further, those who are able to find work are often dissatisfied with those jobs in terms of pay and work (Visher et al. 2008). Released prisoners often lack employment skills and have limited work experience prior to prison (Petersilia 2003).

Third, access to transportation is an important issue to consider for prisoner reentry, as it has been found to reduce recidivism (Northcutt Bohmert 2015). A lack of transportation can directly promote criminal behavior (such as driving without a license), and it can reduce one's ability to meet the conditions of supervised release (such as reporting to a scheduled supervision meeting). In addition, a lack of transportation can make it difficult to successfully reintegrate into the community by hindering other aspects that are necessary, such as employment or treatment. However, one in four released prisoners report difficulty accessing transportation after release (La Vigne et al. 2008).

Fourth, family relationships are important for successful reentry. Strong social bonds to family members are important in the desistance process (Sampson and Laub 1993), and family members provide a great deal of financial and emotional support to prisoners returning home (LeBel and Maruna 2012). Studies have shown that releasees who develop a self-image as a "family man" are less likely to recidivate (Bucklen and Zajac 2009; LeBel et al. 2008), as are those with stable family relationships (Bucklen and Zajac 2009) and strong attachments to their children (Visher and Courtney 2007).

Reentry programming

Because of the high rates at which offenders return to prison, several attempts have been made across the country to create programs that reduce recidivism among ex-prisoners. A recent meta-analysis found that programs designed to help offenders reenter the community reduced recidivism by, on average, 6 % and that treatment programs were most successful if they began when offenders were still in prison and continued after their release into the community, targeted high-risk offenders, were offered by criminal justice agencies, adhered to a therapeutic community treatment

model, and were at least 13 weeks in length (Ndrecka 2014). Several comprehensive reentry programs that, like HRRR, were designed to address multiple criminogenic needs have been evaluated in California (Zhang et al. 2006), Massachusetts (Braga et al. 2009), New York (Hamilton 2010; Jacobs and Western 2007), and Ohio (Miller and Miller 2010), with results showing that these programs help prisoners reenter society and that they effectively reduce recidivism.

Several reentry programs have been implemented and evaluated in Minnesota; lessons learned from these interventions were considered when designing HRRR. First, the Serious Offender Accountability Restoration (SOAR) project, funded by the Federal Serious and Violent Offender Reentry Initiative (SVORI), was created in 2003 to assist high-risk offenders with housing, employment, and substance abuse or mental health treatment. An evaluation showed that the program did not significantly reduce recidivism (Minnesota Department of Corrections 2006; see also Lattimore and Visher 2009). Second, the Prisoner Reentry Initiative (PRI), implemented in 2008, employed reentry coordinators to provide supplemental case planning and facilitate interagency collaboration. PRI did not have a significant effect on recidivism, in part because the program may not have been implemented with fidelity; for example, the reentry coordinators often assisted community corrections agents with heavy caseloads rather than providing supplemental case planning (Minnesota Department of Corrections 2011). Third, also implemented in 2008, the Minnesota Comprehensive Offender Reentry Plan (MCORP) was designed to increase offender access to services in the community through collaboration between prison caseworkers and community supervision agents. MCORP effectively increased employment, community support programming, and social support among participants (Duwe 2012). Further, in a study examining recidivism across a three-year period, MCORP significantly reduced four of the five recidivism measures examined (Duwe 2014).

The programs reviewed above were designed for prison releases in general; however, the HRRR program is unique in that it specifically targets offenders who were incarcerated for violating the conditions of their supervised release. Targeting release violators may be especially effective, as these offenders have demonstrated high risk of at least one type of recidivism, and targeting high-risk offenders is one of the central principles of effective intervention (e.g., Andrews et al. 1990). However, programs of this nature are rare due to the relatively short incarceration periods served by release violators (an average of six months).[2] To date, there are few evaluations of reentry programs specifically designed for release violators; rather, most studies examining the effectiveness of responses to parole violations focus on incarceration or intermediate sanctions. However, some relevant evaluations have been conducted; for example, a Pennsylvania substance abuse program for repeat parole violators found that participants were more likely than comparison group members to return to prison for a parole violation; however, it was unclear whether this was because participants were subjected to increased supervision (Porter 2002). In addition, a Connecticut program that targeted probation violators in a manner similar to HRRR significantly reduced probation violations (Cox et al. 2005). Due to the lack of research on programming for release violators, the current study provides an important contribution to the reentry literature.

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[2] This average is based on offenders released from prison in calendar year 2013.

Minnesota High Risk Revocation Reduction (HRRR) Program

This study evaluates the Minnesota High Risk Revocation Reduction (HRRR) Program, a pilot program funded by the Second Chance Act. The program was designed as a comprehensive intervention that addresses multiple criminogenic needs and responsivity factors that are issues for prisoners reentering society, including housing, transportation, employment, family relationships, and transportation. HRRR operated during two main phases of implementation: Phase 1 ran from April 2011 to April 2012 and Phase 2 ran from September 2012 to December 2015. The program operated similarly in both phases, although the grant funding was reduced in Phase 2 at the same time that the program expanded slightly, from 239 offenders who participated in Phase 1 to 282 offenders in Phase 2.

During both phases of implementation, HRRR was largely administered by grant-funded reentry coordinators, who worked with community supervision agents to provide sustained case planning. Unlike standard case planning, which takes place in correctional facilities before release, the reentry coordinators had offices both in the facility and in the community, allowing them to work with offenders before and after release and collaborate with community supervision agents. Offenders began the HRRR program at least 60 days before release and continued in the community for 6 to 12 months after release. Before their release, participants were able to meet with their reentry coordinators and orientations were held in the facilities to allow them to meet with grant-funded service providers.

In addition to supplemental case planning, another major feature of the HRRR program was a community hub where released offenders could meet with reentry coordinators, community supervision agents, and service providers (from grant-funded programs or local non-profit organizations). The services provided by the program targeted issues surrounding housing, employment, family relationships, and transportation. First, participants were eligible for short-term, transitional housing at grand-funded facilities (up to 75 days), and some participants were also eligible for cash assistance for housing. Second, the program included up to 16 weeks of subsidized employment at several work sites located around the Minneapolis-St. Paul metropolitan area, as well as work readiness assistance and referrals to other employment opportunities and career training programs. Third, the program provided life skills programming that focused on family violence prevention, interpersonal relationships, and prosocial skills, as well as group mentoring sessions. Finally, during the first year after release, program participants could receive up to three free passes for the Minneapolis-St. Paul public transportation system. Due to the sustained case planning and access to the community hub, HRRR participants should receive more services than offenders undergoing standard case planning, which occurs in the facility and focuses on outlining the conditions of supervised release, helping offenders locate eligible housing, and making some referrals to community-based treatment programs.

HRRR has several features in common with the programs previously implemented in Minnesota that were described above. However, there are two main differences that may increase its effectiveness. First, like PRI, HRRR includes additional reentry staff (reentry coordinators). Because of lessons learned with PRI—where reentry coordinators inadvertently assisted with heavy caseloads rather than enhancing case planning—staff were proactive in ensuring that HRRR coordinators fulfilled their intended

purpose. Second, compared to the prior Minnesota programs, HRRR has fewer limitations regarding which offenders are eligible; most notably, sex offenders and offenders released on intensive supervised release were enrolled. Therefore, the HRRR program targeted offenders with the highest risk of violating supervised release, which could result in a more substantial impact on recidivism (Andrews et al. 1990), especially supervised release revocations.

An evaluability assessment of HRRR (Walters et al. 2013) was conducted to assess the extent to which the program was delivered as planned, the amount of program exposure participants received, the degree to which participants were engaged with the program, and the preparedness of the staff delivering the program. Despite some implementation challenges—including a state government shutdown, limited pre-release services, budget reductions, and staff changes (for more information, see Clark 2015; Walters et al. 2013)—the authors of the evaluability assessment concluded that HRRR maintained fidelity to its original design and was an evaluable program. In particular, they noted several positive characteristics, such as targeting of high-risk offenders, strong collaboration between MnDOC and community organizations, availability of individual-level data, and the study's experimental design.

The initial outcome evaluation of HRRR (Clark 2015), which covered the program's first phase, showed that program participants were significantly more likely to receive certain services, including cognitive-behavioral therapy, employment assistance, transportation assistance, and transitional housing, than those in the control group. However, there was not a significant difference between the treatment and control groups in the total number of services offenders received. In terms of recidivism, at one to two years after release, HRRR participants were 43% less likely to be reconvicted and 28% less likely to have their parole revoked for technical violations than were members of the control group (Clark 2015).

Research methods

Procedure

Release violators who met the eligibility criteria to participate in HRRR were identified by MnDOC research staff. To be eligible to participate in the program, adult male release violators had to (1) be located at participating facilities for the entirety of their confinement[3]; (2) have at least 60 days of confinement time remaining at the time of selection, but have no more than 180 days total confinement time; (3) plan on returning to Anoka, Dakota, Hennepin, or Ramsey county[4]; (4) have at least 150 days of community supervision remaining after release; and (5) not have a new pending sentence or a serious pending charge (as determined by reentry coordinators and other grant staff).

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[3] During the first wave of grant funding (April 2011 to October 2011), the participating facilities were Minnesota Correctional Facility (MCF)-Lino Lakes and MCF-Rush City. Due to a reduction in grant funds during later waves, offenders were only eligible if they were located at MCF-Lino Lakes.

[4] These four are the largest counties in Minnesota and central to the Minneapolis-St. Paul metropolitan area. About 40% of offenders released from Minnesota prisons are returned to these four counties.

Once eligible offenders were identified, MnDOC research staff used simple randomization to randomly assign the offenders to either participate in HRRR or receive standard case planning as part of the control group. Because there were not enough release violators eligible for the program to assign equal numbers to the treatment and control groups, a 2:1 allocation model was used, with two thirds of the offenders assigned to HRRR and one third assigned to the control group. Prior research has shown that a 2:1 ratio does not bias results or significantly reduce in power when the imbalance is random, as it is here (Dumville et al. 2006; Schulz and Grimes 2002). To increase the number of offenders in the control group, 23 release violators who were not at one of the participating facilities[5] at the time of selection but met the other criteria for eligibility were assigned to the control group (8.6% of control group members were located at nonparticipating facilities). Participants were dropped from the study if they were assigned to the treatment group but transferred to nonparticipating facilities, or if they were assigned to either the treatment or control group but ultimately returned to nonparticipating counties. Treatment group members who refused all services were still considered part of the treatment group, and reentry coordinators would continue to offer them grant-funded services for up to one year.

During the first phase of the program, 165 offenders were included in the treatment group while 79 offenders were placed in the control group. In Phase 2, there were 146 HRRR participants and 188 control group members. In total, when combining the participants from both phases of implementation, there were 311 HRRR participants and 267 control group members. Table 1 presents a baseline comparison between the HRRR participants and the control group members on several key characteristics. There were few significant differences between the two groups. During Phase 1, one significant difference was found: the treatment group was made up of fewer property crime offenders (4%) than the control group (10%). During Phase 2, first, the HRRR participants had significantly more prior supervision failures than the control group members (2.96 versus 2.25). Second, the Phase 2 treatment group had a larger percentage of sex offenders than the Phase 2 control group (32% of the treatment group versus 21% of the control group).

When comparing the combined groups, first, the HRRR participants were significantly older (mean = 36.51) than the offenders in the control group (mean = 34.86). Second, the overall group of HRRR participants had more prior supervision failures (mean = 2.87) than did offenders in the control group (mean = 2.39). Third, the combined HRRR group had fewer institutional discipline convictions (average = 11.99) than did the combined control group (average = 16.52). It is unclear why these differences between groups were observed. One possible explanation is that the control group included offenders from nonparticipating facilities, who may have been substantively different from offenders at the participating facilities.[6]

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[5] The majority of offenders in the sample (77%) were incarcerated at MCF-Lino Lakes, while 19% were at MCF-Rush City and 4% ($n = 23$) were at other facilities. Results of supplemental bivariate analyses showed no facility differences in any of the recidivism outcomes (i.e., neither the binary indicators of recidivism nor the time to first recidivism event).

[6] Supplemental analyses were conducted comparing control group members at participating facilities to those at nonparticipating facilities. Those at nonparticipating facilities had significantly longer length of stays, more discipline convictions, and fewer prior convictions, were more likely to be released on ISR, and were less likely to have completed treatment.

Table 1 Baseline comparison of treatment and control groups

	Phase 1 (2011–2012)			Phase 2 (2012–2015)			Overall program		
	Treatment	Control	t value	Treatment	Control	t value	Treatment	Control	t value
Age at release (years)	36.35	35.71	0.45	36.71	34.50	1.95	36.51	34.86	1.97*
LSI-R	27.43	27.83	− 0.39	30.28	30.45	− 0.18	28.77	29.51	− 1.09
Length of stay (months)	3.69	3.72	− 0.16	3.22	3.43	− 1.35	3.47	3.51	− 0.38
Sentence length (months)	73.45	73.22	0.03	68.71	74.54	− 0.93	71.23	74.15	− 0.62
Institutional discipline	12.32	17.68	− 1.65	11.63	16.03	− 1.93	11.99	16.52	− 2.50*
Minority	68%	73%	− 0.79	71%	71%	− 0.15	69%	72%	− 0.65
High school diploma/GED	75%	71%	0.71	75%	82%	− 1.46	75%	79%	− 0.97
ISR	54%	61%	− 1.01	50%	53%	− 0.48	52%	55%	− 0.71
Completed treatment	29%	32%	− 0.41	15%	20%	− 1.11	23%	23%	− 0.20
Prior record	− 0.03	0.003	− 0.31	0.15	− 0.09	1.93	0.05	− 0.06	1.35
Prior supervision failures	2.80	2.72	0.29	2.96	2.25	2.03*	2.87	2.39	2.13*
Prior convictions	3.92	4.34	− 0.68	5.08	4.43	1.20	4.46	4.41	0.14
Type of offense									
Person	27%	28%	− 0.19	26%	35%	− 1.70	26%	33%	− 1.63
Property	4%	10%	− 2.05*	10%	9%	0.55	7%	9%	− 0.99
Drug	12%	9%	0.63	10%	11%	− 0.11	11%	10%	0.92
Sexual	28%	28%	0.01	32%	21%	2.34*	30%	23%	1.93
DWI	17%	14%	0.61	8%	9%	− 0.32	13%	10%	0.91
Other	13%	11%	0.39	14%	17%	− 0.83	14%	15%	− 0.63
N	165	79		146	188		311	267	

*$p < .05$

Next, to further examine balance between the treatment and control groups, logistic regression models predicting membership in the HRRR treatment group were conducted. The results (Table 2) showed that none of the covariates were significantly associated with assignment to the treatment group. In addition, the null results of the *F* tests show that the set of covariates did not jointly differentiate the treatment group from the control group.

Dependent variables

Recidivism was measured in four ways: rearrest for a new offense, reconviction for a new offense, reincarceration for a new offense, and revocation for a technical violation. The first three of these measures represent new criminal activity, while the fourth variable measures more general rule breaking, including legal behavior not allowed among parolees (e.g., alcohol use, failing to meet with parole officer). These outcomes include both "status" variables indicating whether an offender recidivated and "time" variables measuring the number of months between release and the first recidivism event. Recidivism data were collected through March 31, 2017, giving offenders a follow-up period between 21 and 69 months, with an average of 46 months.

Arrest and conviction data were obtained electronically from the Minnesota Bureau of Criminal Apprehension (BCA). Reincarceration and revocation data were obtained from the Correctional Operations Management System (COMS) database maintained by MnDOC. It is important to note that the dependent variables only measure arrests, convictions, or incarcerations that took place in Minnesota. Because they did not include reoffending that occurred in other states or that went undetected by the criminal justice system, these variables may underestimate the true rates of reoffending.

Independent variable

The independent variable of interest is participation in HRRR. Offenders who participated in HRRR were given a value of 1, and those in the control group were assigned a value of 0.

Control variables

In addition, to account for potential differences in recidivism caused by factors other than HRRR participation, several correlates of recidivism identified by previous research were used as controls.[7] First is the most recent Level of Service Inventory-Revised (*LSI-R*) score prior to release, to account for individual recidivism risk. *Prior record* is a factor score based on prior convictions and prior supervision failures (eigenvalue = 1.498). Also, the number of *discipline* convictions received during the entire current sentence is included as a potential control. Next is a binary indicator of whether the offender was from a *racial/ethnic minority* group (1) or was non-Hispanic White (0). *Age* measures the offender's age in years at the time of the most recent

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[7] No problems with collinearity were found; the correlations between predictors were all lower than 0.5 and tolerance values for all predictors were above 0.6.

Table 2 Logistic regression models predicting assignment to HRRR

	Phase 1 (2011–2012)	Phase 2 (2012–2015)	Combined
LSI-R	0.013 (0.022)	− 0.002 (0.017)	− 0.009 (0.013)
Minority	− 0.180 (0.344)	0.075 (0.271)	− 0.024 (0.202)
Age at release (years)	0.003 (0.017)	0.019 (0.013)	0.011 (0.010)
Length of stay (months)	0.012 (0.128)	− 0.098 (0.084)	− 0.030 (0.066)
Sentence length (months)	0.003 (0.003)	− 0.001 (0.002)	0.0002 (0.002)
Institutional discipline	− 0.017 (0.008)	− 0.009 (0.007)	− 0.010 (0.005)
High school diploma	0.110 (0.331)	− 0.449 (0.290)	− 0.293 (0.212)
ISR	− 0.298 (0.327)	0.026 (0.245)	0.036 (0.185)
Person offense	0.087 (0.361)	− 0.338 (0.267)	− 0.148 (0.202)
Completed treatment	− 0.421 (0.333)	− 0.525 (0.322)	− 0.231 (0.217)
Prior record	− 0.141 (0.193)	0.122 (0.119)	0.061 (0.099)
Constant	0.591 (1.098)	0.129 (0.864)	0.558 (0.652)
F	0.62	1.46	1.18

Coefficients are presented with standard errors in parentheses

$*p < .05$

release from prison. *Length of stay* measures the number of months the offender spent in prison between the supervised release revocation that made him eligible for the study and the subsequent release from prison. *Sentence length* measures the total length of the offender's current sentence in months. *Education* is measured as a binary indicator of whether the offender had a high school diploma or equivalent. *Treatment* is captured by a binary indicator of whether the offender completed chemical dependency or sex offender treatment while in prison for the current sentence. A binary indicator of whether the offender was released under *Intensive Supervised Release* (ISR) is included. *Offense type* is measured as a binary variable with a score of 1 assigned to release violators whose current offense is a person offense. Finally, because the program effects may vary by phase of implementation, a binary variable is included to identify whether the offender was in *Phase 1* of the program.

Statistical analysis

Because information on the timing of recidivism events was available, this study used survival analysis to examine recidivism. Survival analyses are preferable over logistic regression because they allow for an examination of not only whether offenders recidivate, but also how quickly after release they do so. In particular, this study used Cox regression models, which employ both "status" and "time" variables. The "status" variable for each recidivism type was a binary variable with a value of 1 if the event occurred. The "time" variable measured the amount of time (in months) between the release date and the date of the first recidivism event (or March 31, 2017, for those who did not recidivate). Three sets of analyses were conducted to examine the four measures of recidivism among Phase 1 offenders, Phase 2 offenders, and all offenders.

As recommended by Senn (1994) and de Boer et al. (2015), the main analyses are fully adjusted by controlling for all available prognostic variables. Supplemental analyses were conducted controlling for only the four variables that were identified in Table 1 as different across groups: prior record, offense type, age, and institutional discipline. The results were similar to those presented below. Multiple imputation was used to handle missing data (57 cases did not have valid LSI-R scores[8]).

Results

Bivariate results

Table 3 provides a bivariate comparison of recidivism outcomes between the HRRR and control groups. These bivariate results show that, first, among offenders included in Phase 1 of the program, there were no significant differences in either the likelihood of rearrest, reconviction, reincarceration, or revocation of supervised release or the time to the first recidivism event. Second, among Phase 2 offenders, a significantly higher percentage of control group members (76%) than HRRR participants (62%) were rearrested. However, the number of months to the first rearrest was not significantly different, and no differences were observed for the other measures of recidivism.

When combining offenders from both phases of the program, rearrest was higher among the control group for the overall sample: 77% of the control group were rearrested, compared to 68% of the HRRR group. In addition, control group members were rearrested more quickly than HRRR participants: the average time to first rearrest was approximately 18 months for the control group, compared to approximately 24 months for the HRRR group. Treatment and control group members were equally likely to be reconvicted, reincarcerated, or have their supervised release revoked during the follow-up period. However, control group members were reconvicted (mean = 27 months) and reincarcerated (mean = 38 months) more quickly than HRRR participants (mean time to reconviction = 33 months, mean time to reincarceration = 43 months).

Multivariate results

Phase 1

The results of the multivariate analyses predicting recidivism among Phase 1 release violators are presented in the left side of Table 4. The results of the Cox regression models show that, among HRRR participants, the risk of rearrest was 26% lower ($p = .072$), risk of reconviction was 20% lower ($p = .215$), risk of

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[8] Few differences were observed between offenders with and without LSI-R scores at release. Offenders without LSI-R scores had significantly longer sentences. In addition, more LSI-R scores were missing among the control group and Phase 2 offenders.

Table 3 Recidivism outcomes for treatment and control groups

| | Phase 1 (2011–2012) | | | Phase 2 (2012–2015) | | | Overall program | | |
	Treatment	Control	t value	Treatment	Control	t value	Treatment	Control	t value
Rearrested during follow-up period	72%	80%	− 1.43	62%	74%	− 2.36*	67%	76%	− 2.36*
Months to first rearrest	30.10	24.67	1.70	16.73	15.38	0.93	23.82	18.13	3.60*
Reconviction during follow-up period	56%	62%	− 0.84	43%	50%	− 1.24	50%	52%	− 0.81
Months to first reconviction	40.47	37.33	0.97	24.32	22.81	1.09	32.88	27.10	3.61*
Reincarceration during follow-up period	31%	29%	0.28	16%	18%	− 0.27	24%	21%	0.90
Months to first reincarceration	53.8	26.3	− 1.17	30.90	30.78	0.12	43.05	38.33	3.41*
Revocation during follow-up period	81%	87%	− 1.38	73%	71%	0.37	77%	76%	0.34
Months to first revocation	18.21	12.78	1.85	12.61	13.01	− 0.27	15.58	12.94	1.77
N	165	79		146	188		311	267	

*$p < .05$

Table 4 Cox regression models predicting four types of recidivism, by phase of implementation

	Phase 1 (2011–2012)				Phase 2 (2012–2015)			
	Rearrest	Reconviction	Reincarceration	Revocation	Rearrest	Reconviction	Reincarceration	Revocation
HRRR participant	0.74 (0.12)†	0.80 (0.15)	1.34 (0.35)	0.74 (0.12)†	0.77 (0.11)†	0.77 (0.13)	0.86 (0.25)	0.99 (0.14)
LSI-R	1.04 (0.01)**	1.02 (0.02)	1.02 (0.02)	1.01 (0.01)	1.01 (0.01)	1.00 (0.01)	1.00 (0.02)	1.01 (0.01)
Minority	1.07 (0.20)	1.08 (0.23)	1.38 (0.44)	0.97 (0.17)	1.24 (0.21)	0.83 (0.16)	1.18 (0.40)	1.04 (0.17)
Age at release (years)	0.96 (0.01)***	0.96 (0.01)**	0.95 (0.02)**	0.98 (0.01)*	0.96 (0.01)***	0.95 (0.01)***	0.95 (0.02)**	0.99 (0.01)
Length of stay (months)	0.95 (0.07)	0.92 (0.08)	0.96 (0.10)	1.00 (0.07)	1.02 (0.05)	0.93 (0.06)	0.95 (0.10)	1.00 (0.05)
Sentence length (months)	1.00 (0.00)	1.00 (0.00)	0.99 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	0.99 (0.00)*	1.00 (0.00)
Institutional discipline	1.00 (0.01)	1.00 (0.01)	1.01 (0.01)	1.00 (0.00)	1.00 (0.00)	1.01 (0.01)	1.02 (0.01)**	1.00 (0.00)
HS diploma or GED	0.99 (0.18)	1.14 (0.23)	0.79 (0.21)	1.29 (0.25)	0.88 (0.16)	0.94 (0.20)	1.23 (0.42)	0.70 (0.12)*
ISR	0.66 (0.12)*	0.78 (0.16)	0.88 (0.25)	1.50 (0.26)*	0.55 (0.08)***	0.44 (0.08)***	0.30 (0.10)***	1.71 (0.25)***
Completed treatment	1.20 (0.22)	0.90 (0.19)	1.06 (0.33)	0.96 (0.18)	0.72 (0.15)	0.90 (0.21)	0.74 (0.33)	0.95 (0.18)
Prior record	1.45 (0.16)**	1.44 (0.17)**	1.64 (0.24)***	1.39 (0.15)**	1.43 (0.11)***	1.43 (0.13)***	1.67 (0.21)***	1.12 (0.08)
Person offense	1.06 (0.21)	1.33 (0.29)	1.59 (0.45)	1.94 (0.38)**	1.07 (0.17)	0.85 (0.16)	1.79 (0.54)	0.95 (0.15)

Hazard ratios are presented with standard errors in parentheses

***$p < .001$; **$p < .01$; *$p < .05$; †$p < .10$

revocation of supervised release was 26% lower ($p = .063$), and risk of reincarceration for a new felony was 34% higher ($p = .257$) than among control group members. While none of these differences were statistically significant, the differences in rearrest and revocation were marginally significant.

In addition to HRRR participation, several of the control variables were related to recidivism. First, age was negatively related to risk of rearrest ($p < .001$), reconviction ($p < .01$), reincarceration ($p < .01$), and supervised release revocation ($p < .05$). Second, more serious prior records were related to higher risk of all four forms of recidivism ($p < .01$). Third, higher LSI-R scores were related to higher risk of rearrest ($p < .01$). Fourth, offenders on ISR had lower risk of rearrest ($p < .05$) but higher risk of returning to prison due to a violation of supervised release ($p < .05$). Fifth, offenders incarcerated for a person offense had higher risk of supervised release revocation.

Phase 2

The right side of Table 4 displays the results of the multivariate analyses predicting recidivism among Phase 2 release violators. The results show that, compared to control group members, HRRR participants' risk of rearrest was 23% lower ($p = .074$), risk of reconviction was 23% lower ($p = .130$), risk of reincarceration for a new felony offense was 14% lower ($p = .595$), and risk of returning to prison for a parole violation was 1% lower ($p = .948$). However, none of these differences were statistically significant, although the difference in rearrest was marginally significant.

Table 4 also shows several significant relationships between the control variables and recidivism. First, offenders on intensive supervised release (ISR) had lower risk of rearrest ($p < .001$), reconviction ($p < .001$), and reincarceration ($p < .001$), but higher risk of returning to prison for a violation of supervised release ($p < .001$). Second, prior record was negatively related to rearrest ($p < .001$), reconviction ($p < .001$), and reincarceration ($p < .001$). Third, age at release was negatively related to rearrest ($p < .001$), reconviction ($p < .001$), and reincarceration ($p < .01$). Longer sentences were related to lower risk of reincarceration for a new felony ($p < .05$), while institutional discipline was related to higher risk of reincarceration ($p < .01$). Offenders with high school diplomas or the equivalent were less likely to return to prison following a revocation of supervised release ($p < .05$).

Overall program

Next, Table 5 presents the results of the multivariate analyses predicting recidivism among the total sample of offenders from both phases of the program. Participation in HRRR was significantly associated with one type of recidivism: rearrest. Specifically, the risk of rearrest was 20% lower for HRRR participants than for the control group ($p = .018$). HRRR participants' risk of reconviction ($p = .063$) and returning to prison for a technical parole violation ($p = .400$) were also lower than those of the control group, while their risk of reincarceration for a new offense ($p = .455$) was higher than that of the control group; however, these differences

Table 5 Cox regression models predicting four types of recidivism, overall program

	Rearrest	Reconviction	Reincarceration	Revocation
HRRR participant	0.78 (0.08)*	0.78 (0.10)†	1.15 (0.21)	0.91 (0.10)
LSI-R	1.02 (0.01)*	1.01 (0.01)	1.02 (0.01)	1.01 (0.01)
Minority	1.16 (0.14)	0.93 (0.13)	1.30 (0.30)	1.01 (0.12)
Age at release (years)	0.96 (0.01)***	0.96 (0.01)***	0.96 (0.01)***	0.99 (0.01)*
Length of stay (months)	1.00 (0.04)	0.95 (0.05)	0.98 (0.07)	1.00 (0.04)
Sentence length (months)	1.00 (0.04)	1.00 (0.00)	0.99 (0.00)**	1.00 (0.00)
Institutional discipline	1.00 (0.00)	1.00 (0.00)	1.01 (0.00)*	1.00 (0.00)
High school diploma/GED	0.93 (0.12)	1.01 (0.15)	0.93 (0.19)	0.92 (0.12)
ISR	0.62 (0.07)***	0.59 (0.08)***	0.59 (0.12)**	1.57 (0.17)***
Completed treatment	0.95 (0.13)	0.88 (0.14)	1.03 (0.26)	0.93 (0.12)
Prior record	1.41 (0.09)***	1.41 (0.10)***	1.61 (0.15)***	1.19 (0.07)**
Person offense	1.04 (0.13)	1.02 (0.15)	1.65 (0.33)*	1.20 (0.15)
Phase 1	0.91 (0.11)	1.05 (0.14)	0.99 (0.21)	1.27 (0.14)*

$N = 521$. Hazard ratios are presented with robust standard errors in parentheses

***$p < .001$; **$p < .01$; *$p < .05$; †$p < .10$

were not statistically significant, although the difference observed for reconviction was marginally significant.

Several of the control variables were significantly related to recidivism in these analyses as well. First, younger offenders had higher risk of rearrest ($p < .001$), reconviction ($p < .001$), reincarceration ($p < .001$), and revocation ($p < .05$). Second, for release violators who were released under ISR, the risk of rearrest ($p < .001$), reconviction ($p < .001$), and reincarceration ($p < .01$) were lower, and the risk of technical parole violation was higher ($p < .001$). Third, the prior record score was positively related to all four measures of recidivism. Fourth, LSI-R scores were positively associated with rearrest ($p < .05$). Fifth, disciplinary infractions while in prison increased the risk of reincarceration ($p < .05$). Sixth, longer sentences were associated with lower risk for reincarceration ($p < .01$). Seventh, offenders who served time for a person offense had greater risk of being reincarcerated for a new felony offense ($p < .05$). Finally, holding other factors constant, Phase 1 release violators had a higher risk of being returned to prison for a technical violation ($p < .05$).

Cost-benefit analysis

While the results presented above suggest lower rates of reoffending among HRRR participants, it is unknown whether this reduction provided a benefit that exceeded the costs to operate the program. To address this issue, a descriptive analysis is presented that compares the costs to run HRRR to the estimated financial benefits produced by a reduction in recidivism. The results of the cost-benefit analysis are

Table 6 HRRR cost-benefit analysis results

	Homicide excluded	Homicide = $8.98 million	Homicide = $12.7 million
Program operating costs			
Contracts	2,128,063	–	–
Personnel	666,545	–	–
Fringe	198,893	–	–
Travel	50,178	–	–
Supplies	26,100	–	–
Indirect costs	49,437	–	–
Total program costs	3,119,216	–	–
Costs per participant	*10,030*	–	–
Costs avoided			
Technical violation revocations			
HRRR = 74,469 prison days	4,244,733	–	–
Average per offender = 153.6 prison days	*8755*	–	–
Comparison = 65,354 prison days ($57/day)	3,725,178	–	–
Average per offender = 244.8 prison days	*13,952*	–	–
Difference = 9115 prison days	(519,555)	–	–
Reoffending/cost of crime			
HRRR participants			
Murder (2 convictions)	–	17,960,000	25,360,000
Other offenses (328 convictions)	7,332,930	–	–
Total reoffending costs (330 convictions)	7,332,930	25,292,930	32,692,930
Average per offender (1.06 convictions)	*23,579*	*81,328*	*105,122*
Comparison group			
Murder (3 convictions)	–	26,940,000	38,040,000
Other offenses (268 convictions)	4,932,425	–	–
Total reoffending costs (271 convictions)	4,932,425	31,872,425	42,972,425
Average per offender (1.01 convictions)	*18,474*	*119,372*	*160,945*
Difference in reoffending costs	(2,400,505)	6,579,495	10,279,495
Total costs avoided	(2,920,060)	6,059,940	9,759,940
Total benefits	**(6,039,276)**	**2,940,724**	**6,640,724**
Benefits per participant	*(19,419)*	*9456*	*21,353*
Cost-benefit ratio	(0.94)	1.94	3.13
Return on investment (ROI) percentage	(6%)	94%	213%

Amounts are reported in US dollars

shown in Table 6. In total, the program costs were $3,119,216, which amounts to $10,030 per participant. It is important to note, however, that these program costs

are indicative and that these startup costs likely vary from the amount that would be necessary to sustain the program.

The costs of recidivism were estimated in two ways. First, the study measured the number of days offenders spent in prison following a technical violation revocation during the follow-up period. Given the small size of the program, the number of bed days saved from a reduction in recidivism would not be large enough to affect the construction of new correctional facilities; therefore, marginal costs (the costs to clothe and feed incarcerated offenders) were used rather than fixed costs, which include greater investments such as new prison construction (see Duwe and Kerschner, 2008). Table 6 shows that HRRR did not produce a benefit when revocation costs were estimated. Program participants spent a total of 74,469 days in prison (average per offender = 239.5), while control group members spent a total of 65,354 days in prison (average per offender = 244.8). The difference between the two groups, then, was 9115 prison days. Given an average marginal per diem cost of $57, HRRR seems to have produced an estimated $519,555 in costs associated with incarceration of technical release violators.

Next, estimates of the costs associated with new offenses were compared for the treatment and control groups. For the purpose of calculating costs of crime, reconviction was used to determine new offenses. Although rearrest is a more sensitive official measure and was significantly related to participation in HRRR, it is not ideal for this analysis because it may include crimes not committed by the offender or instances in which charges were dropped. On the other hand, reincarceration for a new felony is an overly conservative measure for a cost-benefit analysis because it does not include lower-level offenses or felonies for which offenders were not sentenced to prison.

To estimate the costs associated with reoffending, the offenses committed by the treatment and control groups during the follow-up period were monetized based on cost of crime estimates developed by prior research. Studies by Cohen and Piquero (2009); McCollister et al. (2010); and DeLisi et al. (2010) calculated the costs to society for specific offenses, based on victim costs; criminal justice costs including police, courts, and prisons; and lost productivity of incarcerated offenders. All three studies developed estimates for murder, sex offenses, aggravated assault, armed robbery, and burglary. Two studies (Cohen and Piquero 2009; McCollister et al. 2010) developed estimates for simple robbery, arson, motor vehicle theft, fraud, and theft. When more than one estimate was available, the average cost for an offense type, adjusted for inflation to 2010 dollars, was used. When only one estimate for an offense type was available—such as stolen property and forgery—the cost from a single study was used. For other low-level offenses that do not fall into any of these categories—such as drug offenses—Cohen and Piquero's (2009) estimate for miscellaneous offenses was used.

As shown in Table 6, HRRR participants were reconvicted of 330 offenses (average per offender = 1.06), compared with 271 offenses for the control group (average per offender = 1.01). See Appendix Table 7 for more information on the estimation of the costs of reoffending. Among the control group recidivists, three received convictions for homicide offenses, while only two of the HRRR

participants were convicted of murder. This offense had a large impact on the cost-benefit results: the estimated cost to society associated with one murder ranges between $8.98 and $17.3 million. Because of this, three calculations were conducted. The first estimate excluded murder offenses from the cost-benefit analysis. The second used the most conservative estimate of the cost of murder ($8.98 million; McCollister et al. 2010). The third calculation used the average cost estimate ($12.7 million) from the three studies, as was used with all other offense types.

Table 6 shows that the total costs of reoffending varied greatly according to the estimate used for homicide offenses. First, when examining only non-homicide offenses, reoffending costs were $2.4 million higher among the HRRR group than among the control group. However, when including murders but using a conservative cost estimate, the savings associated with lower reoffending costs among the treatment group were $6.6 million. Similarly, based on the average cost of murder offenses, the estimated benefit resulting from lower reoffending costs was $10.3 million.

After accounting for program costs ($3.1 million) and the costs of revocation ($519,555), the results displayed in Table 6 show that the cost-benefit estimate is highly sensitive to the estimate used for homicide offenses. When homicide convictions are excluded, the results indicate that HRRR cost the state about $6 million. When homicides are included, however, the estimated benefits of the program range from $2.9 million to $6.6 million, which amounts to a return on investment (ROI) of between 94 and 213%.

Discussion

The initial outcome evaluation of Minnesota's HRRR pilot program (Clark 2015)—which covered the first of the program's two phases—provided promising results regarding the program's impact on recidivism. The current study conducted a follow-up evaluation of the program in order to examine its long-term success. While the initial evaluation of the program's first phase indicated a short-term reduction in recidivism (Clark 2015), examining the participants over a longer follow-up period suggests that the program may not have been as effective in creating lasting change. Similarly, offenders who participated in the program's second phase were not significantly less likely to recidivate. Still, the results of the overall analysis, which examined both phases, showed that HRRR participants had significantly lower risk of rearrest; in addition, although not statistically significant, HRRR participants were somewhat less likely to be reconvicted. The HRRR pilot project may have also reduced costs, but the estimated size of this benefit was highly sensitive to one homicide offense committed by a control group member, and therefore, the results of the CBA should be viewed with caution.

These findings suggest that early, enhanced release planning may help offenders successfully reenter the community after release from prison. They also show the

importance of multiagency cooperation in making sure offenders' needs are met. However, although the program features several characteristics of effective programs such as components within facilities and in the community and addressing multiple criminogenic needs (Ndrecka 2014), only one measure of recidivism (rearrest) was significantly affected by participation in HRRR. Notably, although the program was designed to target release violators, HRRR did not significantly reduce supervised release revocations in this study. Further research should be done to better understand factors that lead offenders to violate the conditions of their supervised release so that programs to reduce this type of recidivism by targeting these factors can be designed.

The lack of significant findings could indicate that the program has shortcomings that make it less effective. In particular, the program included few pre-release services. Release violators' short stays in prison make programming difficult, but developing treatment programs that begin during this time and continue into the community could be effective. In addition, while HRRR participants during Phase 1 were more likely to receive certain services—such as cognitive-behavioral treatment, employment assistance, subsidized employment, transitional housing, and transportation assistance—they did not receive a significantly greater number of services than did control group members (Clark 2015). In addition, access to services was not measured during the program's second phase. It is unknown whether the program was successful at addressing multiple barriers to compliance with the conditions of supervised release or if it effectively matched services with offenders' needs. Future reentry programs should be designed with a narrower focus rather than attempting to broadly address multiple areas, as this may more effectively address offenders' criminogenic needs.

The findings presented here suggest that the second phase of the program may not have produced the same short-term effects as the first phase. There were some challenges to program implementation during Phase 2 that may explain these findings. First, the program suffered from staff turnover at the community hub during Phase 2, including periods when positions were vacant. As staff turnover can undermine program effectiveness (Farabee et al. 1999; Gendreau et al. 1999), this issue may have had detrimental effects. Second, the protocols regarding offenders' intake to the program changed, causing more participants to enter within a one-month period, thereby reducing the ability to adequately provide comprehensive pre-release services. Increasing the number of participants can stretch resources too thin, reducing the program's ability to operate as designed; therefore, practitioners should carefully consider whether it is more beneficial to serve more participants or to restrict access to the program.

Third, to combat overcrowding that occurred during this time, MnDOC began diverting lower-risk or first-time technical violators to remain in the community or be held in local jails. Because of this, the cohort of release violators who returned to prison—and thus were eligible for HRRR—appeared to be higher-risk offenders with more challenging needs than previous cohorts, including more mental health issues. This change made the participants more difficult to engage in pre- and post-

release activities. Broader policy changes can make it difficult to implement programs with fidelity; practitioners should consider whether upcoming changes are likely and design the program accordingly, or attempt to design programs that are flexible enough to withstand changes. Further, many participants were in discipline confinement before release, making it difficult to complete assessments to identify their criminogenic needs. In addition, offenders in discipline confinement would have had less access to the program's reentry coordinator, decreasing the program's effectiveness. Scholars and policymakers should consider how restrictive housing impacts reentry planning and participation in treatment programs.

On the other hand, some aspects of the study design could account for the null results, especially during Phase 2 of the program. First, a limitation of this study is that the sample size was small and there were few cases with recidivism events. Scholars have argued that there should be a minimum of five to ten events—or cases with a score of "1" on the dependent variable—for each independent variable in the Cox regression model (Penduzzi et al. 1996; Vittinghoff and McCulloch 2007). This was not a great concern for the analyses using the total sample: the rarest recidivism outcome was reincarceration (131 events), resulting in an EPV ratio over ten for all models. However, when examining Phase 1 and Phase 2 separately, reincarceration was fairly rare (74 events for Phase 1 and 57 events for Phase 2), resulting in event-per-variable ratios of 6 for Phase 1 and 4.75 for Phase 2. This makes it possible that there were program effects that were not detected by the statistical analysis.

Second, the follow-up period during which recidivism was measured was longer for offenders who participated in the first phase of the program (the average follow-up time was 63 months for Phase 1 offenders, compared with 33 months for Phase 2). Therefore, later reoffending among Phase 2 release violators may not have been captured, which may have influenced the findings. Third, the evaluation was not set up to track delivery of services between the treatment and control groups. Therefore, it was not possible to control for dosage or to examine whether the null results are due to possible contamination (i.e., if control group members were offered grant services). Fourth, offenders in nonparticipating facilities who were otherwise eligible for the program were placed in the control group. If recidivism is more likely among offenders released from those facilities, this may influence the results. However, supplemental bivariate analyses showed no differences in recidivism across facilities.

In conclusion, this study used an experimental design to evaluate the effectiveness of Minnesota's HRRR program, a pilot project of a reentry program that provided services to release violators in an effort to lower their risk of recidivism. The results provide limited support for the program. One of the four types of recidivism studied here (rearrest) was significantly lower among treatment participants than control group members. However, the program experienced barriers to effective implementation that reduced its ability to reduce recidivism, as evidenced by the lack of significant results in the evaluation of the program's second phase. Identifying these issues and incorporating solutions into future phases of HRRR can increase the program's ability to assist with reentry and reduce recidivism.

Appendix

Table 7 Costs of reoffending

Offense type	Cost estimates				HRRR group		Control group	
	Cohen and Piquero (2009)	McCollister et al. (2010)	DeLisi et al. (2010)	Average	Convictions (N)	Average cost	Convictions (N)	Average cost
Murder	11,800,000	8,980,000	17,250,000	12,680,000	2	25,360,000	3	38,040,000
Sex offense	290,000	240,776	448,532	326,436	4	1,305,744	1	326,436
Agg. assault	85,000	107,020	145,379	112,466	12	1,349,592	11	1,237,126
Simple assault	19,000	–	–	19,000	27	513,000	26	494,000
Armed robbery	280,000	–	335,733	307,867	10	3,078,670	7	2,155,069
Simple robbery	39,000	42,310	–	40,655	3	121,965	1	40,655
Burglary	35,000	6462	41,288	27,583	16	441,328	12	330,996
Arson	115,000	21,103	–	68,052	1	68,052	0	0
Motor vehicle theft	17,000	10,772	–	13,886	0	0	0	0
Stolen property	–	7974	–	7974	7	55,818	5	39,870
Embezzlement	–	5480	–	5480	0	0	0	0
Forgery	–	5265	–	5265	7	36,855	5	26,325
Fraud	5500	5032	–	5266	5	26,330	3	15,798
Theft	4000	3532	–	3766	36	135,576	25	94,150
Other	1000	–	–	1000	200	200,000	172	172,000
Total costs						32,692,930		42,972,425

Amounts are reported in US dollars

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