Sonoma County AB 109 Day Reporting Center Outcome Evaluation

Prepared by:

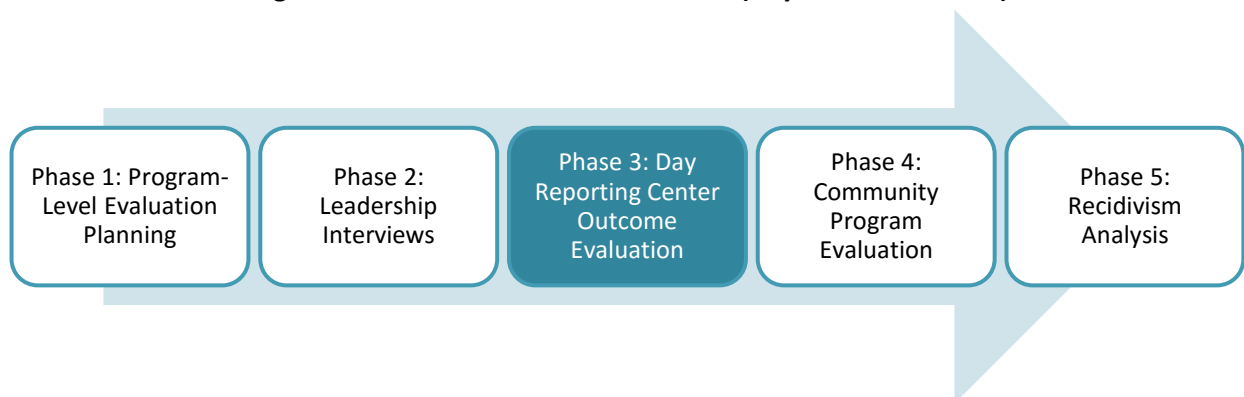**Resource Development Associates**

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Overview

California Assembly Bill 109 (AB 109) is the cornerstone of the state's legislative efforts to reduce the prison population and close the revolving door of justice system involvement for individuals convicted of non-violent, non-serious, and non-sexual offenses. In 2016, the Sonoma County Community Corrections Partnership (CCP) contracted Resource Development Associates (RDA) to conduct a comprehensive evaluation of the implementation, effectiveness, and costs associated with AB 109 realignment. Beginning in 2016, RDA worked with Sonoma County to identify the key priorities and areas of interest pertaining to the county's AB 109 system, examine the availability and quality of quantitative data sources, and develop a plan for comprehensive evaluation. RDA and the County are employing a developmental approach to evaluation, in which annual evaluation plans are designed to build on the learnings from the previous year. In the first year of the evaluation, RDA completed the following activities:

- **System-Level Process Evaluation** of the overall implementation of the county's AB 109 system and associated programs and services
- **Recidivism Outcomes Analysis** of individuals under Mandatory Supervision (MS) or Post-Release Community Supervision (PRCS)
- **Needs and Cost Analysis** of MS and PRCS individuals' assessed needs and the county's spending on associated programs and services
- **Day Reporting Center (DRC) Process Evaluation** to examine implementation of the DRC

The second year of the evaluation includes the five phases in Figure 1.

Figure 1. Year Two Evaluation Activities (July 2018–June 2019)

Phase 1: Program-Level Evaluation Planning	Phase 2: Leadership Interviews	Phase 3: Day Reporting Center Outcome Evaluation	Phase 4: Community Program Evaluation	Phase 5: Recidivism Analysis

This report comprises Phase 3, the Day Reporting Center (DRC) Outcome Evaluation. Located across the street from the County Complex, the DRC provides a central location for individuals under probation supervision, including those in the AB 109 population, to meet with probation officers and connect with programs and services. The DRC Process Evaluation, completed as part of the Year 1 AB 109 Evaluation, focused on the successes and challenges in the implementation of the DRC—including an analysis of attendance and completion rates, fidelity to evidence-based practices, and adherence to DRC Core Program Values.

The DRC Outcome Evaluation builds upon the DRC Process Evaluation by examining the relationship between participation in DRC programs and individual outcomes. This report is guided by the following evaluation questions:

Evaluation Questions

1. To what extent are programs and services offered within the DRC having the desired impact on addressing individual needs?
2. To what extent is level of participation in the DRC associated with a decrease in recidivism?
   a. What, if any, individual characteristics are associated with lower rates of recidivism among DRC participants?
3. To what extent is participation in the DRC associated with a decrease in recidivism compared to individuals that do not participate in the DRC?

Methodology

This report examines the outcomes of regular[1] DRC participants who received DRC services between January 2015[2] and September 2018.[3] The analysis included several phases. First, we examined the **program-specific outcomes** of regular DRC participants enrolled in cognitive behavioral interventions and employment services.

Second, we analyzed the **association between level of DRC participation and recidivism**. To calculate level of participation, we used DRC attendance records to determine the total number of hours that each participant attended DRC courses and activities.[4] DRC activities that do not target criminogenic needs, such as community service and eligibility interviews, did not count towards dosage hours. DRC participants were placed into mutually-exclusive dosage categories[5] based on the hours they accumulated:

- Low Dosage: 10-29 hours
- Medium Dosage: 30-59 hours
- High Dosage: 60 or more hours

For example, a person who has completed 50 hours of qualifying programming at the DRC would be classified as medium dosage. While that individual has also completed the threshold for the low dosage group (ten hours), the individual will only be measured for the highest dosage level attained. If DRC participants with a suspended or exited status reenrolled in the DRC within 1 year, dosage hours continued to accrue after their return.

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[1] The DRC is also open to individuals receiving a limited number of services that are not fully enrolled, regular participants. These individuals are excluded from the analysis.

[2] The Sonoma County Probation Department assumed operation of the DRC from a private contractor in 2015. Due to a change in provider, employment outcome data is reported from 8/2015–9/2018.

[3] Survival analyses report recidivism outcomes for individuals who received DRC services from 1/2015–7/2018.

[4] Hours continued to accumulate for DRC participants who left the DRC and reenrolled within one year.

[5] Dosage categories were constructed based on feedback from DRC staff.

Third, we utilized propensity score matching (described below) to identify a sample of the DRC participant population and a comparison group of non-DRC participants on probation. In this analysis, we examined the **impact of DRC participation on recidivism outcomes**. We compared DRC participants (the treatment group) to a similar group of individuals on probation who did not enroll in the DRC (the comparison group) to try and isolate the impact of DRC participation.

Throughout this report, **recidivism** is defined as conviction for a new misdemeanor or felony offense. The date of recidivism is defined as when an individual is arrested for a new offense—if that arrest resulted in a conviction. Arrests that did not result in a conviction were excluded from the analysis. Flash incarcerations and probation revocations that were not associated with a new offense were used to calculate time spent in custody, but were not counted as recidivism in the analysis. Due to data availability, recidivism events that occurred outside of Sonoma County were not included.

Analytic Methods

Survival Analysis. RDA assessed the relationship between DRC participation and recidivism using survival analysis, a commonly used method to analyze recidivism rates and isolate the effect of different factors on the likelihood and rate of recidivism.[6] Survival analysis examines the amount of time it takes for a given outcome to occur. In this case, the analysis examines the amount of time until a DRC participant or individual in the control group recidivates.[7] If an individual never recidivates, he or she is considered to have "survived" the entire timeframe under analysis. Based in public health research (hence the "survival" terminology), this is a particularly useful approach for analyzing data where different individuals have had different periods of time during which an outcome could occur, as is the case for individuals with different amounts of time since their release from custody.

Propensity Score Matching. Propensity score matching is a statistical matching technique used to estimate the effect of an intervention by comparing the outcomes of a treatment group (i.e., the individuals who received the intervention) to a matched comparison group with similar characteristics. Propensity score matching calculates the probability of an individual receiving an intervention based on the degree to which that individual has similar characteristics as individuals in the treatment group. This probability (propensity score) is predicted for each individual in the sample and the outcomes of the individuals in the treatment and control groups are compared to determine the effect of the treatment. In this analysis, individuals in the comparison group were selected based on criteria relating to demographics, criminal history, and criminogenic risk and needs scores (see Appendix C for a more information about comparison group construction).

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[6] Schmidt, P. Witte, A.D. (1988). *Predicting Recidivism Using Survival Models. Research in Criminology.* Springer.
[7] Time to recidivism was adjusted for time in custody, because it is assumed that individuals were not at risk of being charged with a new offense while detained.

Data Sources

RDA utilized nine data sources for this analysis (see Table 1). All data sources, with the exception of the DRC Employment data,[8] were provided by the Sonoma County Probation Department.

Table 1. Summary and Sources of Data Elements for Analysis

Data Source	Key Data Elements
DRC Participant Dataset	• DRC enrollment and end dates
Probation Participant Dataset	• Probation start and end dates • Demographic information; supervision and offense type
DRC Classes and Activities	• DRC class and activity enrollment and attendance
Recidivism Event Dataset	• Arrest date, conviction date, and most serious offense
Custody Events and Jail Days Dataset	• Date and time of jail booking and release
Offender Needs Assessment Scores	• Offender Needs Assessment date and scores
Static Risk Assessment Scores	• Static Risk Assessment date and score
DRC Participant ART/CBI Scores	• Skillstreaming, Criminal Sentiments Scale, Aggression Questionnaire, and How I Think assessment scores
DRC Employment Data	• Participants' employment outcomes

Limitations

Treatment and Outcomes Measurement. This study does not take into account the duration of individual's participation in the DRC. For example, a person who received 30 hours could have completed those hours within a few weeks or within a few months of DRC enrollment. Second, research has shown that recidivism rates decrease over time, with individuals recidivating most frequently directly after release or beginning probation.[9] Since it takes time to accumulate DRC hours and move into higher dosage categories, individuals with higher dosage levels may have lower recidivism rates due to the impact of time, making it challenging to isolate the effects of DRC participation.

Availability of Data and Omitted Variable Bias. Data for program-level analyses were limited, therefore this evaluation only reports program outcomes for a subset of DRC programs. Additionally, data were not available to determine whether individuals benefitted from participation in non-DRC programs that could also influence their recidivism rate. Last, propensity score matching relies upon observed and available data to create similar control and treatment groups. Any differences between groups that is related to recidivism and is not controlled for in the analysis can lead to omitted variable bias, which means that we cannot attribute differences in recidivism to DRC participation because the treatment and comparison groups are different. In this analysis, we do not know what criteria probation officers consider when making DRC referrals and how this varies across probation officers. Without controlling for these criteria, it is possible that significant differences remain between the treatment and comparison group.

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[8] Employment data provided by Job Link.
[9] For example, 27% of individuals released from CA state prison in FY2009–2010 recidivated in the first quarter, with this rate decreasing to 23% in the second quarter, 16% in the third quarter, and 12% in the fourth quarter. CA Department of Corrections and Rehabilitation. (2013). *County and Region of Parole: Calendar Year 2012.*

DRC Participant Population

The DRC enrolls approximately 250 regular participants[10] annually, with slightly under 1,000 unique participants enrolled from January 2015 through September 2018. The majority of regular participants are on formal probation (56%), with slightly less than half (44%) sentenced under AB 109 on either PRCS (30%) or Mandatory Supervision (14%). Probation officers refer individuals on their caseloads to receive DRC services, which can take place at any time during an individual's supervision term.

Figure 2. Regular Individuals Enrolled at the DRC (n = 948)
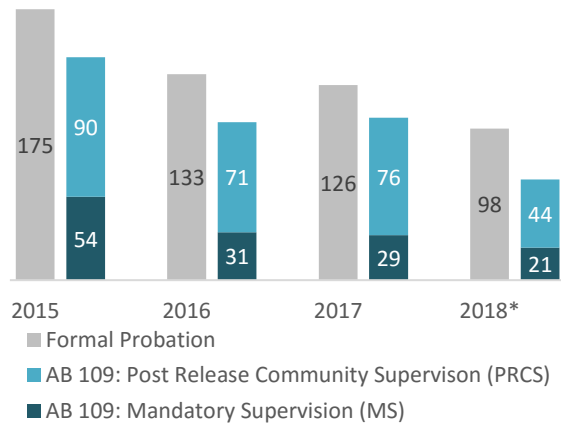
2018 data from January-September

Table 2. DRC Participant Demographics, 2015-2018 (n=948)

Participant Characteristic	%
Race / Ethnicity	
Non-Hispanic White	62%
Hispanic	23%
Black	10%
Asian / Pacific Islander	2%
American Indian	2%
Other / Multiracial	1%
Gender	
Male	85%
Female	15%
Average Age at Start	35
Risk Level	
Low	9%
Moderate	24%
High	67%

As shown in Table 2, the majority of DRC participants are white and male, with a sizeable minority of Hispanic individuals. The composition of the DRC participant population approximates the demographic breakdown of the probation population in Sonoma County and is similar to the broader Sonoma County population, with the exception of the disproportional representation of Black individuals on probation and in the DRC participant population.[11]

The sizeable majority (67%) of DRC participants have been assessed as high-risk to recidivate using the Static Risk Assessment, with less than one-tenth of participants assessed as low-risk. Almost all (94%) of DRC participants had been convicted of a felony offense prior to DRC participation.

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[10] The DRC is also open to individuals receiving a limited number of services that are not fully enrolled, regular participants. These individuals are excluded from the analysis.

[11] Approximately 2% of the Sonoma County population is Black.

DRC Programs and Services Outcomes

Evaluation Questions

- To what extent are programs and services offered within the DRC having the desired impact on addressing individual needs?

DRC staff facilitate three courses designed to promote pro-social behavior and cognitive restructuring: Cognitive Behavioral Interventions – A Core Curriculum, Aggression Replacement Training, and Cognitive Behavioral Interventions – Advanced Practice. These are foundational courses for most participants and therefore have the highest enrollment numbers, compared to other education, employment, parenting, and substance abuse programs offered at the DRC.

Table 3. Cognitive Behavioral Program Enrollment and Completion (2015-2017)

Course Name	Enrollment[12]	Completion
Cognitive Behavioral Interventions- A Core Curriculum (CBI-CC)	694	240 (35%)
Advanced Practice	109	40 (37%)
Aggression Replacement Training (ART)	153	103 (67%)

CBI-CC enrolls the highest number of participants and requires more time (generally 7-9 months) to complete, as compared to Advanced Practice or ART. As indicated in Table 3, **completion rates are much higher in ART** (67%), **compared to CBI and Advanced Practice** (35% and 37%, respectively). Participants who did not complete these courses generally ended because they left the DRC, which may be due to completion of their probation term.

CBI and ART Assessments

The CBI and ART curricula both include pre-post assessments to measure changes in participants' behavior, attitudes, and skillset. Each assessment is a self-report questionnaire that participants complete close to the start and at the conclusion of the course. Overall**, assessment results show an increase in participants' use of prosocial skills, a decrease in pro-criminal attitudes, and no statistically significant change in cognitive distortions or aggression levels.** The greatest increase was in the reported use of prosocial skills, from the ART class.

Each assessment tools' results are displayed in Table 4. As noted in the table, only a small sample of course participants took both a pre- and post-test appropriate for comparison.[13] See Appendix A for more information about each tool.

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[12] Regular participants only. This table reflects the number of unique individuals enrolled in courses between 2015-2017 – some individuals enrolled multiple times in each course.

[13] Small samples are due, in part, to validity concerns about CBI pre-scores from 2015 and 2016.

Table 4. Assessment Tools and Results

Course	Tool	Measurement Areas	Pre-Post Change
CBI	Criminal Sentiments Scale	Criminal attitudes across: Attitudes towards the Law, Court, Police; Tolerance for Law Violations; and Identification with Criminal Others	10%* decrease in criminal sentiments (n=30)[14]
ART	How I Think Questionnaire	Self-serving cognitive distortions: Self-Centered, Blaming Others, Minimizing/Mislabeling, and Assuming the Worst	3% decrease in overall cognitive distortions (n=39)[15]
ART	Aggression Questionnaire	Physical aggression, verbal aggression, anger, hostility, and indirect aggression	3% increase in use of aggression (n=31)
ART	Skillstreaming Checklist	Use of pro-social skills	19%* increase in use of pro-social skills[16] (n=46)

*statistically significant (p<.05)

Employment

From August 2015 through September 2018, 292 DRC participants attended employment workshops and/or received individualized job search guidance at the DRC through Job Link. **Of these 292 individuals, 26%** (n=76) **were placed in jobs.**[17]

DRC Dosage and Recidivism Outcomes

Evaluation Questions

- To what extent is level of participation in the DRC associated with a decrease in recidivism?

- What, if any, individual characteristics are associated with lower rates of recidivism among DRC participants?

From December 2014 through July 2018, 921 regular participants enrolled in the DRC. As mentioned in the methodology section, participants were placed into three mutually-exclusive dosage categories based on the amount of time each individual spent attending courses and activities at the DRC.

- Low Dosage: 10-29 hours
- Medium Dosage: 30-59 hours
- High Dosage: 60 or more hours

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[14] 2015 and 2016 scores are not included, due to validity concerns (see Appendix A for more information).

[15] Additionally, of the 11 individuals whose overall cognitive distortion pre-score fell within the clinical range, approximately half of those individuals scored within the borderline-clinical or nonclinical range in the post-test.

[16] The pre-post change refers to the specific eight to ten skills focused on in each course.

[17] Job placement data was self-reported by individuals who attained employment and may be underreported.

Additionally, we created a fourth category of individuals who enrolled in the DRC, but received less than 10 hours. Though we do not expect less than 10 hours to affect recidivism outcomes, this group is used as a reference when comparing dosage category outcomes.

Table 5. DRC Participant Characteristics, January 2015-July 2018 (n=921)

|	High Dosage (n=314)	Medium Dosage (n=151)	Low Dosage (n=150)	DRC Hrs <10 (n=306)
Gender				
Male	84%	85%	83%	89%
Female	16%	15%	17%	11%
Race				
Non-Hispanic White	63%	60%	59%	62%
Hispanic White	23%	25%	28%	22%
Black	9%	9%	9%	11%
Other	5%	7%	4%	6%
Risk Level				
Low	8%	15%	6%	8%
Moderate	31%	20%	20%	21%
High	61%	65%	74%	71%

As shown in Table 5, DRC participants across dosage levels had similar demographic characteristics and risk profiles. Approximately a third of the DRC population was in the high dosage category, with 16% medium dosage, 16% low dosage, and 30% who received less than ten hours.

Figure 3 shows the estimated rate at which recidivism occurred after participants reached their dosage level. The estimates are made using observed recidivism data and adjusting for differences in probation supervision type, race, and risk level to isolate the impact of DRC dosage.[18] The figure has four lines that form curves, one for each dosage category. The vertical (or Y) axis, indicates the proportion of people who survived (e.g., did not recidivate) over time. The value is a fraction which runs from one at the top to zero at the bottom, representing 100% survival to 0% survival. A survival curve always begins with 100% survival at day 0. For our analysis, day 0 is when individuals reached their dosage category (e.g., for an individual in the medium dosage group, day 0 is the day that he or she received 30 DRC hours). The more gradual the slope of the curve, the fewer individuals that are estimated to recidivate over time. If an individual never recidivates, he or she is considered to have "survived" the entire two-year time period.

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[18] These times were also adjusted for time in custody, because it is assumed that individuals were not at risk of being charged with a new offense while detained.

Figure 3. Recidivism Survival Curve, by DRC Dosage (n=921)
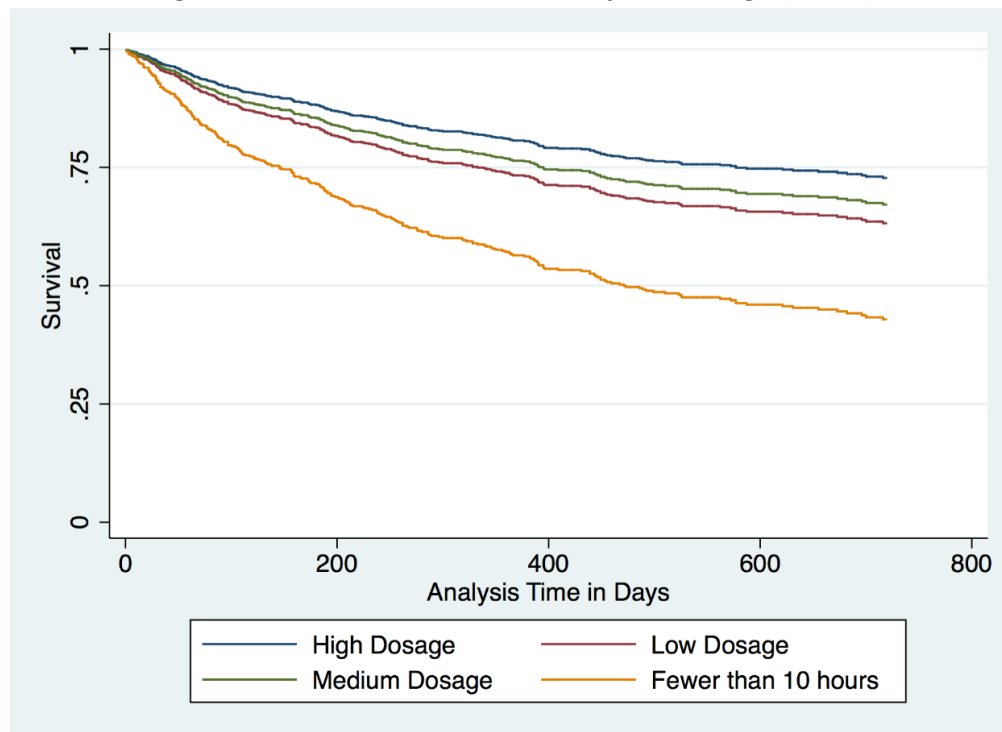
As shown in Figure 3, **DRC participants with higher dosage levels were less likely to recidivate within two years compared to participants with lower dosage levels**. The high dosage group (blue line) has lower recidivism than all other dosage groups, with recidivism slightly increasing as dosage levels decrease. This difference in recidivism is statistically significant between the high dosage group and participants with less than ten hours, as well as the medium dosage group and participants with less than ten hours. DRC participants that received high dosage were 58% less likely to recidivate than DRC participants who received less than ten hours. DRC participants with medium dosage were 34% less likely to recidivate than DRC participants who received less than ten hours (see Appendix B for statistical test results). The probability of recidivating within two years was approximately 25% for those in the high dosage group, compared to about 60% for those with less than ten hours of course completion.

In addition to analyzing the association of recidivism with DRC dosage, we examined the association between individual characteristics and recidivism (see Appendix B). We found low risk individuals had a significantly lower likelihood of recidivating compared to moderate risk individuals, and high risk individuals had a significantly greater likelihood of recidivating than low or moderate risk individuals. Individuals on formal probation also had a significantly lower likelihood of recidivating when compared to individuals on Mandatory Supervision. Other characteristics, such as race, were not associated with any change in the likelihood of recidivism, holding other factors constant.

DRC and Non-DRC Participation Comparison for Recidivism Outcomes

Evaluation Questions

- To what extent is participation in the DRC associated with a decrease in recidivism compared to individuals that do not participate in the DRC?

To compare the outcomes of DRC participants[19] to individuals on probation who did not participate in the DRC, we identified a sample of the DRC participant population and a comparison group of non-DRC individuals on probation with similar characteristics in order to try to isolate the impact of the DRC. When comparing the characteristics of all DRC and non-DRC individuals on probation, there are several key differences (see Table 6). Though the two groups have similar race, gender, and age profiles, when compared to non-DRC individuals, the DRC has a greater proportion of individuals with high risk levels and a greater proportion are sentenced under AB 109 on Post Release Community Supervision (PRCS).

Table 6. DRC & Non-DRC Probation Characteristics

	DRC Participants (n=615)	Non-DRC Probation (n=1,597)
Risk Level		
Low	9%	20%
Moderate	26%	34%
High	65%	46%
Supervision Type		
Formal Probation	58%	79%
Mandatory Supervision	14%	13%
PRCS	28%	9%
Race		
Non-Hispanic White	62%	59%
Hispanic	24%	28%
Black	9%	8%
Other	5%	5%
Gender		
Male	84%	82%
Female	16%	18%

To compare DRC participants to the non-DRC group, we employed propensity score matching to create a similar sample of DRC participants (treatment group) and non-DRC individuals on probation (comparison group). In this analysis, individuals in the comparison group were selected based on similarities to DRC participants in demographics, criminal history, and criminogenic risk and needs scores (see Appendix C for more information about comparison group construction). Of the 615 DRC participants with more than ten

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[19] Because we do not expect to see any effect on recidivism from less than ten hours of service at the DRC, we only included DRC participants who received more than ten hours in this analysis.

hours of service, we were able to match 474 DRC participants to a sample of 474 individuals on probation who did not attend the DRC. As shown in Table 7, the treatment and comparison group in the matched sample have similar risk profiles and supervision types.

Table 7. Matched Sample Characteristics[20]

	DRC Participants (n=474)	Non-DRC Probation (n=474)
Risk Level		
Low	10%	10%
Moderate	28%	28%
High	63%	62%
Supervision Type		
Formal Probation	67%	68%
Mandatory Supervision	15%	14%
PRCS	18%	19%

Figure 4 shows the rates of recidivism for DRC participants (after they enrolled at the DRC) and the comparison group of individuals on probation (after they started their probation term). If an individual never recidivates, he or she is considered to have "survived" the entire two-year time period. The red line represents DRC participants and the blue line represents individuals on probation who did not enroll in the DRC. The distance between the two represents the difference in the predicted likelihood of recidivating at any given point in time. The difference between these lines is not statistically significant, indicating **no meaningful difference between the recidivism rates of DRC participants and the comparison group of non-DRC participants**.

Figure 4. Matched Sample Recidivism Survival Curve

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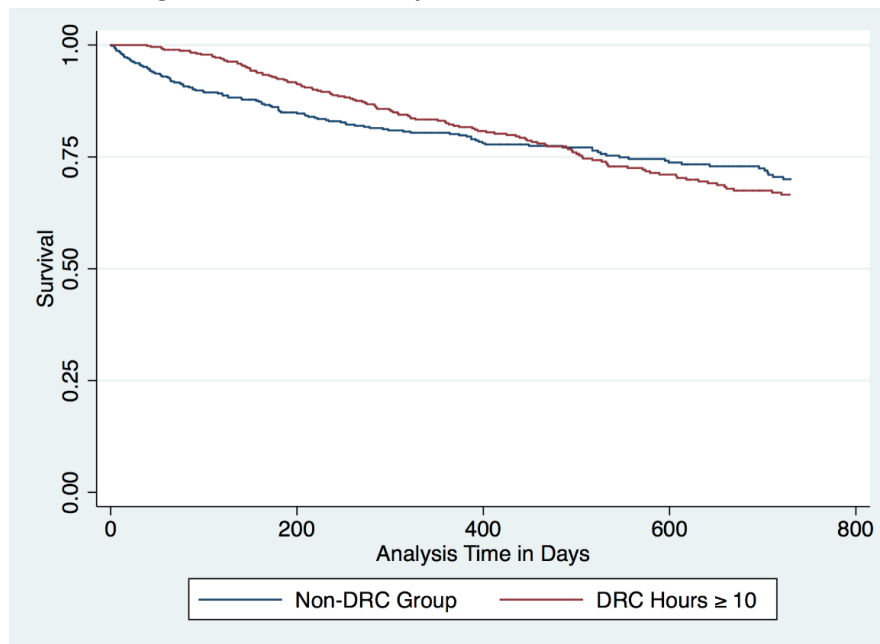
[20] See Appendix C for a full table of characteristics that includes needs scores.

Discussion

This report explores the relationship between participation in DRC and participant outcomes, examining both program-specific outcomes and recidivism outcomes. Below are key takeaways from the findings presented in the sections above.

Program Outcomes. Assessment tool scores indicate that the DRC's cognitive behavioral courses increase participants' use of prosocial skills and decrease pro-criminal attitudes, though no statistically significant change was found in cognitive distortions or aggression levels. Overall, results suggest that cognitive behavioral courses may be having the intended effect. Increasing the number of participants with both pre- and post-scores will provide more data to better understand participant outcomes.

Approximately one third of unique individuals complete CBI and Advanced Practice courses, with the majority of participants leaving the course because they were no longer at the DRC. As noted in RDA's *DRC Process Evaluation*, we recommend the Sonoma County Probation Department explore potential strategies to mitigate barriers and external factors that inhibit participants' engagement in the DRC.

Recidivism Outcomes. Overall, recidivism analyses suggest that DRC services may decrease recidivism. The comparative analysis of DRC participants and individuals on probation who did not attend the DRC did not indicate a significant relationship between DRC participation and recidivism. However, though we controlled for observable characteristics (e.g., risk level, criminogenic needs), it is possible that the comparison and treatment group have *unobserved differences* that are partially responsible for different recidivism outcomes. In particular, we do not know what criteria probation officers consider when making DRC referrals; therefore, these criteria could not be controlled for in the analysis.

The analysis of DRC dosage levels found a negative association between DRC participation and recidivism. This analysis, which compared recidivism outcomes of DRC participants with different levels of participation, found that DRC participants who receive 60 or more hours are 58% less likely to recidivate than DRC participants with less than ten hours. Since recidivism rates decrease over time, DRC participants with high participation levels may, in part, have lower recidivism due to the time it took for them to accrue these hours. Though the impact of time creates challenges in isolating the impact of the DRC, this analysis is less likely to suffer from unobserved differences related to risk profiles and client characteristics. Individuals with less than ten hours experienced the same referral decision-making process as individuals with more than ten hours, therefore they may be more similar than the comparison group of non-DRC individuals on probation constructed through propensity score matching. Last, it is important to note that DRC hours still fall short from the recommended levels of intervention for high-risk and moderate-risk individuals (200-300 hours and 100-200 hours, respectively), and additional DRC programming may be necessary to significantly impact recidivism outcomes.[21]

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[21] Sperber, K., Latessa, E. & Makarios, M. (2013). Examining the Interaction between Level of Risk and Dosage of Treatment. *Criminal Justice and Behavior*. 40. 338-348.

Appendix A. CBI and ART Assessment Tools and Results

Cognitive Behavioral Interventions (CBI)

CBI participants complete the Criminal Sentiments Scale (CSS) assessment at the fourth CBI session[22] and at the conclusion of the course. The CSS is a 41-item self-report questionnaire that is intended to measure criminal attitudes in three domains: Attitudes towards the Law, Court, Police; Tolerance for Law Violations; and Identification with Criminal Others.

From January 2017-September 2018, 344 CBI participants took the CSS assessment, with 68 individuals completing multiple assessments. Of those 68 individuals, 30 took both a pre- and post-assessment. Participants complete the questionnaire by indicating whether they agree, disagree, or are uncertain about each statement. Higher scores indicate pro-criminal attitudes, with a total score range from 0-82. As shown in Table 8, individuals' CSS scores reduced, on average, by 10% from pre-test to post-test. This change is statistically significant.

Table 8. CSS Scores (January 2017-September 2018)

Test	Average Score
Pre-Assessments (n=211)	32.1
Post-Assessments (n=152)	26.6
Pre-Post Change (n=30)	10% decrease (-5.0 points)*

* $p < .05$

Aggression Replacement Therapy (ART)

ART participants complete three assessments: the How I Think questionnaire (HIT), Aggression Questionnaire (AQ), and Skillstreaming Checklist. Each assessment is administered upon course start and at course completion.

How I Think (HIT) Questionnaire. From January 2015 through September 2018, 83 ART participants completed the HIT Questionnaire. Of those 83 individuals, 39 took both a pre- and post-assessment. The HIT Questionnaire is a 54-item self-report assessment that measures four types of self-serving cognitive distortions: Self-Centered (disregarding the views of others), Blaming Others, Minimizing/Mislabeling (minimizing the harm of anti-social behavior), and Assuming the Worst. Participants complete the questionnaire by indicating their level of agreement (1-6 Likert scale) with each statement.

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[22] In 2015 and 2016, the CSS was administered at intake. The Probation Department noticed that some scores increased dramatically after CBI completion, which they surmised indicated a lack of honesty on the initial assessment. As a result, they changed the timing of the initial test to the fourth CBI session to provide participants time to develop trust and rapport with Probation staff and the DRC. Due to these validity concerns, pre-tests from 2015 and 2016 are not included in this analysis.

The HIT produces three summary scores: an overall HIT score (higher scores indicate more cognitive distortions related to antisocial behaviors), an overt summary score,[23] and a covert summary score.[24] These scores each have varying clinical and borderline-clinical cut points.

Table 9. How I Think Scores (January 2015-September 2018)

Domain	Average Score		
	Pre-Test (n=76)	Post-Test (n=44)	Pre-Post Change (n=34)
HIT Overall Score	2.4	2.3	3% decrease (-0.08 points)
Overt Summary Score	2.6	2.5	4% decrease (-0.11 points)
Covert Summary Score	2.1	2.2	2% decrease (-0.04 points)

As indicated in Table 9, participants experienced slight decreases in each area, though these differences were not statistically significant. The average pre- and post- scores within each domain all fall within the nonclinical range. Of the individuals whose pre-score fell within the clinical range, approximately half of those individuals scored within the borderline-clinical or nonclinical range in the post-assessment.

Aggression Questionnaire (AQ). From January 2015 through September 2018, 84 ART participants completed the AQ. Of those 84 individuals, 31 took both a pre- and post-assessment. The AQ is a 34-item self-report questionnaire that measures individuals' physical aggression, verbal aggression, anger, hostility, and indirect aggression. Participants complete the questionnaire by indicating their level of agreement (1-5 Likert scale) with each statement. Scores are categorized into seven ranges: Very Low, Low, Low Average, Average, High Average, High, and Very High. Higher scores indicate higher levels of aggression.

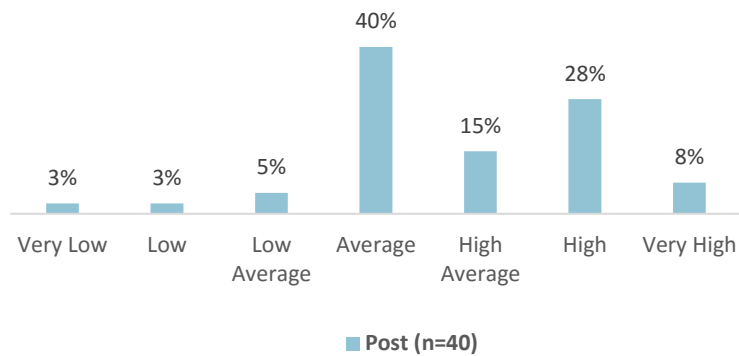**Figure 5. AQ Pre- and Post-Scores (January 2015 - September 2018)**

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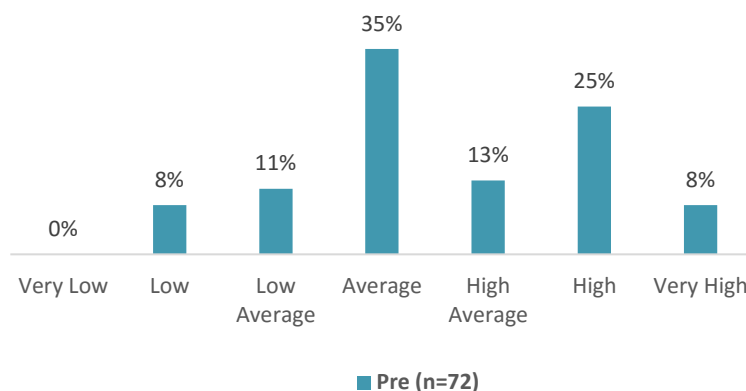
[23] Higher scores indicate a predilection for antisocial behavior that involves confrontation of a victim, such as opposition-defiance and physical aggression.

[24] Higher scores indicate a predilection for antisocial behavior that is non-confrontational, such as lying or stealing.

Post (n=40)

On average, DRC participants scored in the average range for both the pre-test score and post-test (54.8 and 55.9, respectively). For the 31 individuals with a pre- and post-score, scores slightly increased (increase of 3%).

Table 10. Aggression Questionnaire Scores (January 2015 – September 2018)

	Average Score		
	Pre- Score (n=72)	Post-Score (n=40)	Pre-Post Change (n=31)
Aggression Questionnaire	54.8	55.9	3% increase (1.5 points)

Skillstreaming Checklist. From January 2015 through September 2018, 106 ART participants completed the Skillstreaming Checklist. Of those 106 individuals, 46 took both a pre- and post-assessment. In the checklist, users rate their use of 50 skills (1-5 Likert scale). Higher scores indicate a higher use of skills, with a possible score range of 0-250.

Table 11. Skillstreaming Checklist Scores (January 2015-September 2018)

	Average Score	
	Pre- Score (n=103)	Post-Score (n=51)
Skillstreaming Checklist	179	191

Based on pre-scores, each ART course focuses on 9-11 specific skills. When comparing the pre- and post-scores for the specific skills taught in the course, we find a 19% increase in the use of these skills, which is statistically significant (see Table 12).

Table 12. Skillstreaming Checklist Scores (January 2015-September 2018)

	Average Score		
	Pre- Score (n=46)	Post-Score (n=46)	Pre-Post Change (n=46)
Skillstreaming Checklist	31	35	19% increase (5 points)*

* $p < .05$

Appendix B. DRC Dosage Survival Analysis Hazards Ratios

The Recidivism Survival Curve, by DRC Dosage (Figure 3) fits a Cox Proportional Hazards model to adjust by risk level, race, and supervision type. Adjusting for these factors allows us to isolate the impact of our variable of interest, DRC dosage. Table 13 reports hazard ratios from the Cox Proportional Hazards model, which are measures of association used in survival analyses. If a variable has no influence on the outcome, then the hazard ratio will be 1. A variable that increases the likelihood of the outcome will have a hazard ratio above one and a variable that decreases the likelihood of the outcome will have a hazard ratio below one.

Hazards ratios are reported in comparison to a reference group. For Table 13, the reference case—selected for ease of interpretation of results—is a white person, with less than ten DRC hours, with a low risk score who is on mandatory supervision. For this analysis, a hazard ratio below one indicates a decrease in the likelihood of recidivism and a hazard ratio above one indicates an increase in the likelihood of recidivism, compared to the reference group.

We found that high and medium DRC dosage, is associated a 58% and 34% decrease in the likelihood of recidivism, respectively, compared to individuals with less than ten DRC hours. Other statistically significant characteristics are high risk- property and high-risk violence, which are associated with a 111% and 78% increase in the likelihood of recidivism, compared to low-risk individuals. Formal probation, in comparison to Mandatory Supervision, is associated with a 37% decrease in the likelihood of recidivism.

Table 13. DRC Dosage Survival Analysis, Cox Proportional Hazards Model

Variable	Hazard Ratio	Standard Error
DRC Dosage		
High Dosage	0.419***	(0.061)
Medium Dosage	0.658**	(0.114)
Low Dosage	0.782	(0.130)
Risk Level		
Medium Risk	1.480	(0.395)
High Risk - Drug	1.460	(0.444)
High Risk - Property	2.105***	(0.532)
High Risk - Violence	1.779**	(0.440)
Race		
Black	0.979	(0.196)
Latino	1.189	(0.164)
Other race	0.822	(0.216)
Supervision Type		
Formal Probation	0.631***	(0.103)
PRCS	1.298	(0.220)

* indicates p < 0.1
** indicates p < 0.05
*** indicates p < 0.01

Appendix C. Propensity Score Matching and Hazards Ratio

We used propensity score matching to compare DRC participants to non-DRC individuals on probation. We first estimated the probability of DRC enrollment (propensity score) for DRC participants with at least ten hours of course completion and the full non-DRC group. Propensity score matching was conducted using a flexible logistic regression model that included criteria regarding individuals' demographic characteristics, risk level, supervision type, and risk and needs scores. After propensity scores were calculated for the full treatment and comparison group, we constructed a matched sample via nearest neighbor matching.

DRC participants were matched with one member of the non-DRC probation group only, and only if there is a non-DRC member of the control group within 0.2 standard deviations of the propensity score. Of the 615 DRC participants with more than ten hours, 474 DRC participants were able to be matched with non-DRC individuals on probation (77% of DRC participants). As shown in Table 14, the matched sample of DRC participants and non-DRC individuals on probation have almost identical risk levels, supervision types, race/ethnicity breakdowns, and needs assessment scores. However, the matched DRC participant group does not include the 23% of the participant population who could not be matched. Excluding this segment of the participant population—who may have important similarities—may affect the results of the analysis and limit its interpretation.

Table 14. Covariate Balance after Matching

	DRC Participants (n=474)	Non-DRC Probation (n=474)
Risk Level		
Low	10%	10%
Moderate	28%	28%
High - Drug	11%	11%
High - Property	27%	27%
High - Violence	25%	24%
Supervision Type		
Formal Probation	67%	68%
Mandatory Supervision	15%	14%
PRCS	18%	19%
Race		
White	61%	62%
Black	8%	8%
Latino	25%	25%
Other	6%	4%
Needs Assessment: Risk and Protective Factor Scores		
Risk Anti-Behavior	32.1	32.2
Risk Anti-Personality	38.1	38.8
Risk Criminal Associates	27.8	29.1
Risk Criminal Thinking	22.2	22.1
Risk Employment/School	26.8	26.6

Risk Family	12.4	12.3
Risk Substance Abuse	28.6	28.4
Protective Anti-Behavior	23.8	23.0
Protective Anti-Personality	51.7	50.4
Protective Criminal Associates	28.8	28.5
Protective Criminal Thinking	50.0	50.2
Protective Employment/School	40.1	40.2
Protective Family	46.5	46.2
Protective Substance Abuse	22.9	23.1

In surveying the literature on the use of propensity score matching in survival analysis, we found two predominant methods. First, Cox proportional hazard models were fit on full samples and adjusted on the propensity score. Second, Cox proportional hazard models were fit on matched samples, or weighted samples. We examined each of these methods and the results were similar across specifications. For brevity, we only report results from fitting Cox proportional hazards models on matched samples. Table 15 reports results from the Cox Proportional Hazards model. Since the matched sample is constructed to have similar characteristics (see Table 14), the only hazard ratio for the survival analysis is our explanatory variable (DRC participation). As shown in Table 15, DRC participation was not found to have any association with recidivism in the matched sample.

Table 15. Cox Proportional Hazards Model

Variable	Hazard Ratio	Standard Error
DRC	0.995	(0.126)