



Evaluating the Efficacy of Thinking for a Change (T4C) in Reducing Recidivism

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Executive Summary

Thinking for a Change (T4C) is a Cognitive Behavioral Therapy (CBT) intervention designed to reduce criminogenic (crime producing) belief systems. The program has previously been classified as a research-based practice at the Washington State Department of Corrections (WADOC), and an expanded body of literature may ultimately raise it to the level of evidence based. This evaluation was requested by WADOC's department for cognitive behavioral programming to add to the research literature on T4C, and to understand the impact of this program on the WADOC population.

T4C was designed for moderate to high-risk individuals, and WADOC prioritizes the program, accordingly, introducing a selection bias. To accurately assess the program, Propensity Score Matching (PSM) was used to offset the selection bias by constructing a control group which is comparable to the treatment group along variables associated with T4C eligibility and assignment. Additionally, the PSM procedure was asked to exact match on Risk Level Classification (RLC) and race to minimize the difference between treatment and control groups on these variables. Exact matching on RLC ensures matches are at equally assessed risk level, and exact matching on race was necessary due to it being a categorical variable.

Previous research on T4C produced mixed results and had a variety of methodological issues. For example, some research did not account for the non-random selection, was tested exclusively on community corrections populations, or did not test on the target population. Given the extensive data kept by DOC, this study was able to address those shortcomings.

To control for variables previous research had omitted, the population for this study only included non-violator male individuals who had released from a prison facility between 2015 and 2019, and whose T4C completion in that timeframe was the individual's first encounter with the program. To control for the variation in T4C delivery at the WADOC, this larger population was split in to two pools:

1. People who completed T4C in a prison facility between November 1, 2015, and December 31, 2017
2. People who completed T4C in a prison facility between January 1, 2018, and December 31, 2019

Results from raw recidivism rates indicated that treated individuals recidivated at a lower rate. In the 2015-2017 group 29% of treated individuals returned to prison within three years while 32% of the control did. For the 2018-2019 population, 28% of the treated group returned within three years, and 30% in the control. Initial statistical tests showed that the differences between recidivism in the treatment and control groups were not statistically significant. However, binomial models suggest that T4C does result in a statistically significant reduction in the chances of returning to prison once age at release, RLC, and other influential programming are controlled for.

Moving forward, we recommend a focus on fidelity to the Risk Need Responsivity (RNR) principle and the Eight Principles of Effective Intervention, which use RNR as their foundation. Such focus would require WADOC to focus its resources on ensuring fidelity to the implementation checklist, introducing pathways for participant and facilitator feedback, including readiness to change measures in programming prioritization, and regularly administered measures to track changes in criminogenic attitudes over the course of the program. Additionally, we strongly recommend investing in process improvement around the tracking of programming data; this would improve the testability of our programs because dosage would be tracked more reliably.

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Summary of Prior Research and T4C History

Thinking for a Change (T4C) is a cognitive behavioral therapy (CBT) program designed in 1997 by the National Institute of Corrections (NIC). T4C incorporates central themes from cognitive behavioral psychology to target thought patterns and beliefs well understood to be criminogenic. Jack Bush, Ph.D., Barry Glick, Ph.D., and Juliana Taymans, Ph.D. were the cognitive behavioral experts involved in building the curriculum (Bush et al., 1997). The program consists of 22 lessons and has been adopted by many states in both prisons and community supervision settings. Research has produced mixed results.

Of the limited research on T4C, evaluations had populations with multiple genders, did not account for the non-random assignment of T4C to higher risk individuals, or studied the effect of T4C in populations for which it was not designed (i.e. tested program designed for high risk on low-risk individuals) (Golden, 2008; Lowenkamp, 2013; Bickle, 2010). T4C was classified as a promising practice for Washington State Department of Corrections (WADOC) in the 2018 Washington State Institute for Public Policy's (WSIPP) Inventory of Evidence Based, Research Based, and Promising Programs (Wanner, 2018). T4C was categorized as a promising practice because, while it has a well-established theory of change, showed great potential, and has reduced recidivism in conjunction with other CBT based programming (Bitney, 2017), there was simply not enough research on the specific program to warrant a higher classification of evidence-based practice. To better understand the impacts of T4C on its own, test the program on its intended population and its role in rehabilitating individuals within the WADOC population, the WADOC has requested a program evaluation of T4C in its prisons.

At WADOC, the T4C program was introduced in April 2013 and fully implemented in prisons by November 2015. After being fully implemented, the WADOC introduced additional changes to the administration of the program in 2017 which were fully implemented by January 1, 2018. Prior to January 1, 2018, T4C was delivered by volunteer and non-T4C specific program administrators due to staffing shortages, and participants were recruited based on their risk level classification (RLC) using the Static Risk Assessment (SRA), WADOCs classification tool prior to the Washington ONE (WAONE), which assesses needs domains as well as risk.

With the adoption of the Washington ONE classification tool in December 2017, T4C incorporated needs domains when considering program eligibility and prioritization from then on. To be eligible for T4C at WADOC an individual must have a moderate to high RLC and a moderate-high need in either of the following needs domains: Social Influences or Attitudes/Behaviors. By requiring moderate to high risk and a moderate to high need in one of the necessary domains, the WADOC can get T4C to the individuals who would benefit most from the intervention.

For the last several decades, the dominant approach to understanding criminal behavior, recidivism, and effective interventions has been the Risk, Needs, and Responsivity approach (RNR) (Andrews & Bonta, 2010). RNR posits that effective interventions will target well known criminogenic thought patterns and beliefs in a way that considers the needs and disposition of an incarcerated person. The RNR serves as a foundation for eight principles of effective intervention that emerge from literature on correctional efficacy and intervention (Gendreau, 1996, pp. 117-130; Campbell et al., 2019, pp.2-3). They are:

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- 1) Assess Actuarial Risk and Needs
- 2) Enhance Intrinsic Motivation
- 3) Target Interventions Using RNR
 - a. Risk Principle prioritizes supervision and treatment resources for higher risk offenders
 - b. Need Principle targets interventions to criminogenic needs
 - c. Responsivity Principle: Be responsive to learning style, motivation, culture, and gender
 - d. Dosage: Structure 40-70% of high-risk offenders' time for 3-9 months
- 4) Skill Train with Directed Practice (use cognitive behavioral treatment methods)
- 5) Increase Positive Reinforcement
- 6) Engage Ongoing Support in Natural Communities
- 7) Measure Relevant Processes and Practices
- 8) Provide Measurement Feedback

The importance of these principles is supported by Landenberger's 2005 meta-analysis of cognitive behavioral programs, which identified implementation quality, total hours of treatment, offender risk classification, and specific CBT treatment elements (cognitive restructuring, anger control, individual attention, and group sessions) as the factors most associated with a reduction in recidivism across all 58 of the studies considered.

Even more significant than the content of the satisfactory treatments was their implementation. Landenberger's meta-analysis also found that "What seems to most strongly characterize effective CBT programs is high quality implementation as represented by low proportions of treatment dropouts, close monitoring of the quality and fidelity of the treatment implementation, and adequate CBT training for the providers" (Landenberger, 2005, p. 13).

Another meta-analysis was conducted by French and Gendreau (2006), also on the efficacy of CBT based therapies. This analysis utilized 68 studies and found that "the effectiveness of behavioral programming such as CBT is largely contingent upon how closely the RNR principles are followed in program implementation" (Strah, 2018).

With CBT and the importance of the RNR principle established, it is crucial to explore how well T4C conforms to the principles above. Landenberger identifies three principles that make a CBT intervention effective: the curriculum must have cognitive restructuring, methods for responding to and managing anger, and therapy at both the group and individual level. The T4C curriculum (Bush et al., 1997; Bush et al., n.d.) has about two and a half of those three elements. T4C includes cognitive restructuring throughout the course (Bush, 1997, p.7), and there are methods for responding to anger in Lesson 14. The WADOC is about halfway to incorporating individual attention in addition to group work; participants are in group sessions for each lesson, lesson direction is informed by individual needs, and individual questions are answered during lessons. However, individual therapy/attention is not prioritized in the T4C curriculum, and while the facilitator may be answering individual questions or concerns, the primary focus of the program is on *group* learning and improvement.

These generalized principles informed the adjustments made to WADOC's provision of the program leading up to the start of 2018. Specifically, reclassifying the provision of T4C under the structural umbrella of the Reentry Division allowed for changes to be made to who was administering the program and how it was being administered. WADOC moved away from volunteer correctional officers (CO's) with instructional materials providing T4C towards a model wherein providing T4C was the only focus of a designated facilitators responsibilities with WADOC. This change allowed for more in depth and specialized training for providers, and the institutional structure allowed for closer monitoring of the fidelity to T4C implementation, recommendations, and standards.

Outside of DOC, T4C has been evaluated by other departments of corrections and academics in the field of criminology and criminal Justice. Under the supervision of Robert Gatchel, Ph.D., and Melissa Anne Cahill, Ph.D.,

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at the University of South Texas, Lori Golden, Ph.D. evaluated the efficacy of Thinking for a Change on a population of 100 male and 42 female moderate to high-risk probationers compared to a control group matched on demographic variables and criminal history (Golden, 2002; Golden et al, 2008).

Individuals were observed for three months to one year after completion of the program to determine whether they recidivated. Recidivism was defined as having a technical violation of probation or a new criminal offense during the observation period. This research employed several pre- and post-treatment measures to assess changes in attitudes and behavior. There were no differences in technical violations between completers and individuals in the comparison group, and the attitudinal measures showed no differences in pro-criminal sentiments between the groups, an improvement of social skills among only individuals who completed T4C and individuals who dropped out, and those who completed saw a significant improvement in interpersonal problem-solving skills where those who dropped out or were in the control group saw no gains (Golden, 2002, p. 3). In addition to behavioral improvements, the new criminal offense rate for group completers was 33% lower than that for the comparison group, but that difference was not statistically significant (p. 2).

While Golden's methodology and measures are strong and produce promising results, the paper indicates that to be eligible for T4C in their Texas population, the individual may have "6) no active substance abuse problem; 7) no unstable mental illness" (2002, p. 53). The issue with this restriction is that mental health and substance abuse are heavily concurrent with criminal activity, as evidenced by two special reports published by the Bureau of Justice Statistics. The first of these special reports found that 56% of individuals in state prisons, 45% in federal prison, and 64% in local jails meet criteria specified in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) for some mental disorder (James & Glaze, 2006).

The second special report found that 58% of state prisoners and 63% of jailed individuals met criteria for drug abuse or dependence disorders (Bronson et al., 2017). With such a large portion of justice-involved individuals experiencing issues with mental health and/or substance abuse, results from a study excluding these individuals will not give an adequate assessment of T4C within a carceral setting. When Golden's 2002 work was published in the *Journal of Offender Rehabilitation* in 2008, the authors concluded that the results were mixed as there were statistically significant changes in attitudes and positive influences, but the reduction in recidivism associated with T4C was not statistically significant.

In 2009 more research was published on T4C (Lowenkamp, 2009) that took a "real world" approach, meaning the program was administered by corrections practitioners rather than someone affiliated with the development of the program. This meant that the results of this study reflect the impact of T4C more accurately in common correctional settings. Lowenkamp identifies the splitting of Golden's population into completers, dropouts, and the comparison group as a potential for bias and chooses to lump dropouts and completers in to one group. While this method does reduce the bias of the dropout group being higher risk, it muddies the water in terms of understanding the impact of T4C by removing consistent dosage in the treatment population, making the conclusions drawn from the treatment group much less reliable.

Additionally, the sample in their study got its control population from individuals who went on probation in the same timeframe as the treatment population, but who were not referred to T4C (Lowenkamp, p.7). There is no mention of matching procedures in the methods section. Using individuals not referred to T4C introduces its own selection bias, since referral to T4C is not a random process. With the dosage of T4C varying within the treatment population and selection bias in the treatment vs control groups, the results of this "real world" evaluation violate sampling assumptions and cast doubt on the validity of their results.

The year following the publication of Lowenkamp's article, the Ohio Department of Rehabilitation and Correction (ODRC) published its own review of the T4C program that "uses a quasi-experimental, non-random, two group pre-test post-test design, and it explores intermediate outcomes that examine whether the program has influenced participant's self-assessment of their social problem-solving skills and approaches and their

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acceptance of criminal attitudes.” (Bickle, 2010, p. i). This study is an improvement over Lowenkamp’s 2009 study because instead of selecting the control group from probationers not referred to T4C, ODRC drew its comparison population from individuals on the T4C waiting list. This evaluation showed that correctional delivery of the T4C program was successfully changing the attitudes and beliefs in its population but is only the first in a three-part series of research projects where parts 2 and 3 will assess T4C impact on in-prison behavior and post release recidivism respectively (p.1). Lastly, this research did not take other programming in to account due to unreliable data entry. WADOC faces this issue in terms of total hours but leaving out other programming may exaggerate the observed impact of T4C in this population. This is because higher risk individuals are generally prioritized for all sorts of programming, and there is strong evidence to suggest that there is significant benefit when a combination of programs are delivered (Hsieh et.al., 2021). This means that the positive effects being attributed to T4C may be due to the combination of programs they receive.

Given the somewhat mixed bag of results for the efficacy of T4C, research concerning delivery formats was published in the *International Journal of Offender Therapy and Comparative Criminology* (LePlant et al, 2020). The researchers’ findings on changes in attitudes and beliefs were consistent with Golden, Lowenkamp, and the ODRC; exposure to T4C is associated with improvements to criminogenic thought patterns and beliefs. LePlant and associates add to previous findings in showing that those improvements to needs and beliefs were of equivalent magnitude across all the tested delivery modalities, including offender-led groups (pp. 12-14). The finding that diverse modalities of delivery is something to keep in mind as we move forward and make recommendations.

This WADOC study improves on previous research by standardizing the T4C treatment dose (i.e., not including dropouts), focusing on the target population of moderate to high-risk individuals, using a physical return to prison as an inmate to measure recidivism, accounting for the completion of other types of programming, and has a full three-year follow up period. However, the WADOC evaluation does not have pre and post treatment measures of social attitudes and behaviors and thus cannot quantify the individual level changes among completers. Lastly, this is one of the first studies looking at T4C delivery in prisons and measuring post release recidivism, as other projects were looking at delivery in the community or had not yet advanced to assessing recidivism.

Methods

This research utilizes historical WADOC operational data stored in the Offender Management Network Information (OMNI), focusing specifically on criminal sentences, admissions, and programming participation. T4C is offered in multiple WADOC facilities, most of which are facilities for males. As a starting point, all male individuals incarcerated with WADOC for six months or more who released at any point between January 1, 2015 and December 31, 2019 comprised the initial data pull (n=24,266). This pool was split in to two groups: 1. those individuals who were exposed to T4C for the first time (assigned to the program n= 1,767) and 2. those who were not exposed to the T4C program (n= 15,568). From there, the exposed T4C population was narrowed to exclude any individuals assigned to T4C prior to January 1, 2015, and any individuals who attended but did not complete the program for any reason.

Since T4C was designed for high and moderate risk individuals (NIC, Fidelity Checklist), the treatment and population groups are not randomly selected. In a randomized trial, the probability of exposure to a treatment is 50/50 where every person in the control and treatment groups have the same probability of being treated or not. T4C treatment is not randomly assigned thereby introducing selection bias to any statistical analyses. By calculating the probability of being exposed to T4C based on the eligibility criteria discussed earlier, we can construct a control population that has close to the same probability of receiving the intervention as the actual treatment population. This process is known as Propensity Score Matching (PSM). We used PSM to exclusively match those moderate-high risk T4C graduates (treated) to moderate-high risk non-T4C graduates (control) with

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a similar propensity to be assigned to T4C. A propensity score is a conditional probability that, in this case, represents the probability of being exposed to T4C given an individual’s profile of variables used for matching.

An individual was removed from consideration if they completed T4C prior to the admission within the study’s time frame (i.e., if an individual was released from prison in 2016 and again in 2018 and completed T4C during both periods of incarceration, they would only be included in the 2015-2017 delivery group population and excluded entirely from the 2018-2019 population). From the resulting populations, individuals who completed T4C were marked as members of the treatment group and were matched to one individual from the pool marked as control who had the closest *propensity score* to the treated individual within the same racial category and RLC level.

The variables used to assess propensity score were age at release, race, risk level classification, length of prison stay, need domain¹, and criminal history profile. The criminal history profile is a series of eight binary variables indicating whether the individual had a count in their active jurisdiction² that fell in each category. Categories include Murder, Manslaughter, Robbery, Drug Offense, Sex Offense, Assault, Property, and Other/Unknown.

After matching on relevant variables, the 2015-2017 group resulted in an n=1,629 with the Control n=771 and Treated n=858, the 2018-2019 group had an n=1,069 with Control n=525 and Treated n=544. These data were analyzed using chi-square test of independence, odds ratio, survival analysis, and binomial regression. P-values are reported for each of these statistics.

The chi-square test of independence was used to assess whether there were statistically significant differences in recidivism between treatment and control groups; this was used to establish an initial indication of the strength of the relationship between T4C completion and recidivism that could be further refined. The odds ratio calculation was one such clarifying test, as its value indicates a directional comparison between treatment and control groups. Survival analysis was employed to detect evidence of desistance, the idea that moving away from criminal attitudes and behaviors is a process which will necessarily include periods of progress and setbacks. When considering desistance, the question changes from “did they ‘fail’(recidivate)?” to more nuanced questions such as “how long until they returned?”, and “is there a difference in the reasons control vs treatment groups returned?” Lastly, binomial regression was employed to control for other factors likely to influence recidivism like whether an individual had completed other types of programming while incarcerated, and age when they released to the community.

The remainder of this paper attempts to adjudicate between the following hypotheses:

H⁰: Completion of the T4C program is not significantly associated with a difference in recidivism.

H^A: Completion of the T4C program is statistically significantly associated with a difference in recidivism.

¹ A person meets the need domain if the WAONE identifies a moderate to high need in the areas of social influences OR attitudes and behaviors. The need domain criteria are only included for the 2018-2018 population, because the WAONE was not fully implemented in prisons and accounted for by programming until December of 2017.

² A Jurisdiction is a period that an individual is under the purview of WADOC. A period of Jurisdiction closes when the individual no longer has any time left to serve on their sentences in prison or the community. A jurisdiction may stay open for decades, or close in less than a year. The length depends on the sentence handed down by the court, and whether new crimes are sentenced before the previous sentence could conclude.

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Results

Descriptive Statistics

Below are the resulting distributions for control and treatment groups in the Old(2015-2017), and New(2018-19) populations, and Old vs. New delivery methods populations on the variables used for matching.

Table 1. Distributions of study populations by Delivery Method and Treatment vs. Control on PSM variables

	Old 2015-2017 (n=1,629)		New 2018-2019 (n=1,069)	
	Treatment	Control	Treatment	Control
RACE/ETHNICITY				
Asian/Pacific Islander	1.9%	1.8%	4.6%	4.6%
Black	16.7%	17.3%	15.3%	15.2%
Hispanic	9.2%	9.6%	11.4%	11.4%
North Am./AK Native	3.5%	3.6%	5.5%	5.3%
Unknown	<1%	<1%	<1%	<1%
White	68.5%	67.6%	63.1%	63.2%
RLC LEVEL				
MOD	10.0%	9.9%	4.4%	4.5%
HIGH (non-violent)	16.2%	16.0%	20.2%	19.8%
HIGH (violent)	73.7%	73.9%	75.4%	75.6%
AGE AT RELEASE				
Under 25	4.0%	6.0%	7.0%	9.0%
25-34	37.9%	34.5%	37.7%	39.8%
35-44	34.3%	29.6%	36.8%	29.9%
45-54	18.4%	22.7%	14.7%	16.4%
55-64	5%	6.4%	3.5%	4.6%
65+	<1%	<1%	<1%	<1%
PRISON STAY				
<2 years	23.4%	32.7%	54.0%	60.6%
2-5 years	66.7%	56.9%	42.7%	32.8%
5-10 years	9.9%	10.5%	3.1%	6.7%
10+	0.0%	<1%	<1%	<1%
CRIME TYPE				
Assault	42.8%	42.5%	47.4%	51.8%
Drug	38.1%	42.3%	41.9%	45.7%
Manslaughter	1%	<1%	<1%	<1%
Murder	<1%	<1%	0.0%	0.0%
Other/Unknown	28.4%	30.5%	33.8%	36.4%
Property	47.5%	50.6%	45.6%	41.9%
Robbery	10.1%	11.5%	7.0%	5.1%
Sex Offense	16.8%	17.6%	11.6%	9.3%

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Table 2 – Recidivism Percentages by Delivery Method and Experimental Group

	Old (2015-17)		New (2018-19)		Combined (2015-2019)	
	Treated	Control	Treated	Control	Treated	Control
Returned	246 (28.7%)	241 (31.3%)	151 (27.8%)	157 (29.9%)	397(28.3%)	386(30.7%)
No Return	612 (71.3%)	530 (68.7%)	393 (72.3%)	368 (70.1%)	1,005(71.7%)	871(69.3%)

Table 2 indicates relatively consistent recidivism rates for corresponding treated and control groups. Further statistical testing explores whether these differences (between treatment and control as well as between old and new treatment group).

Table 3 below breaks down the reasons individuals returned to prison in more general categories, treating each category as its own 100% unit (i.e., of the treated individuals who returned to prison from the old population, 74.3% were returning with a new sentence).

Table 3 – Reasons for Return by Delivery Method

	Old(2015-17)		New(2018-19)	
	Treatment	Control	Treatment	Control
New Sentence	68.3%	74.2%	63.6%	73.9%
Revocation or Re-classification	31.3%	25.8%	36.5%	26.1%
Other	<1%	0.0%	0.0%	0.0%

Of all individuals who returned to prison within three years of release from both populations, 52.9% came back on a new sentence, 16.1% came back on a CCI/CCJ return³, and 10.3% due to DOSA reclassification⁴. The remaining 20% consisted of revocations with new sentences, violations and returns with new sentences, and other categories comprising less than 1% of recidivists.

Explanation of Statistical Background

The chi-square test assesses whether the observed data is in line with what you would expect based only on chance. The chi-square distribution is a theoretical distribution that accounts for *degrees of freedom*, or the number of variables that can freely change within the model, when considering what distribution chance would produce between two independent variables. In the test of independence, the difference between the observed and expected counts in a contingency table is squared and divided by the expected counts. The chi-square value

³ CCI refers to Community Corrections Inmate and CCJ refers to Community Corrections Jurisdiction. These individuals are sentenced to serve their time in the community. A CCI/CCJ return is one where an individual violated the terms of their community sentence and go to a Prison facility to finish serving their sentence.

⁴ A DOSA (Drug Offense Sentencing Alternative) reclassification could be the result of a new crime, violating terms of a residential DOSA and triggering the reclass. It is also possible that the individual was released to the residential portion of DOSA and returned for a new crime or other violation of terms. An individual may be given a DOSA where prison.

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is the sum of those products. Once the test statistic has been calculated, the critical value can be identified using the significance threshold (p-values).

A p-value assesses the difference between expected values if the null hypothesis is true and what is observed. While the calculation of p-value depends on the type of statistic, the p-value itself indicates the probability of another sample of the same size being selected and having as extreme or more extreme of a result than in the observed data. Thus, the lower the p-value the less likely that your null hypothesis is true. The standard significance level is $p = 0.05$. In other words, we cannot reasonably reject the null hypothesis if the probability of another random sample matching the observed is greater than 0.05 (5%).

If a statistical test is run and the P-value indicates statistical significance, then you can reasonably reject the null hypothesis and fail to reject the alternative hypothesis. Conversely, if the p-value does not indicate statistical significance, you would fail to reject the null hypothesis. The language of “failure to reject” is important because in statistics, nothing is ever certain, and is essentially saying that the sample being analyzed does or does not provide enough evidence to reasonably conclude whether there is an effect/relationship.

Bivariate Findings

Table 4 - Weighted chi-square results

Population	Chi-Square Value	P-Value	Weighted Chi-Square
Old Tx (2015-2017)	0.231	0.631	Y
New Tx (2018-2019)	0.176	0.675	Y
New vs. Old	0.137	0.711	N

Signif. codes: $p < 0$ '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The chi-square test of significance for the 2015-2017 population incorporating propensity score weights (Olmos & Govindasamy, 2015) indicate a non-statistically significant relationship between recidivism and T4C with a $X^2 = 0.231$ and $0.05 < p = 0.631$. In the 2017-2019 population, the weighted chi-square was 0.176 and $0.05 < p = 0.675$. Since the Old treatment and new treatment were not matched to each other, a weight using propensity scores is unavailable. The unweighted chi-square test between old and new treatment types was $X^2 = 0.137$ and $0.05 < p = 0.7113$ indicating no statistically significant relationship between recidivism and the method of T4C delivery. Based on these results we fail to reject the null hypothesis. In other words, there is not sufficient statistical evidence from this test to refute the claim that that treatment and control groups have similar rates of recidivism.

The chi-square test, however, does not indicate the direction of a relationship like an odds ratio test. The odds ratio test compares within the sample to measure the association between an exposure and outcome. An odds ratio of 1 indicates equal odds between groups. If the ratio is less than one then that group is *less* likely than the comparison group and if it is greater than 1, the group is *more* likely to have a certain outcome than the comparison.

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Table 5 - Odds Ratio and P-value for each group and CI

Population	Odds Ratio	Lower Limit	Upper Limit	P-Value
Old Tx (2015-2017)	0.884	0.715	1.093	0.255
New Tx (2018-2019)	0.900	0.691	1.174	0.438
New vs. Old	1.046	0.824	1.330	0.711

Signif. codes: p < 0 '****' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The odds ratio for the old treatment (2015-2017) was 0.88 and had a p-value of 0.255. This finding suggests that individuals in the sample who completed T4C had 88% the odds of recidivating as compared to the control participants, but with such a large p-value, we must fail to reject the null hypothesis. Even though the data is indicating that the treated population has lower odds of recidivating, the high p-value suggests that this difference could easily be the product of chance.

For the new treatment method (2018-19), the odds ratio was 0.9 and had a p-value of 0.438. Thus, we fail to reject the null hypothesis that T4C treatment via the new delivery method compared to no treatment is significantly related to recidivism. The same conclusion can be drawn when comparing old and new treatment deliveries to each other, where the odds ratio was 1.04 and p=0.711.

This is further evidence in support of failing to reject the null hypothesis that completion of T4C programming is not significantly associated with a reduction in recidivism. But, like the chi-square test of independence, the odds ratio does not control for the effects other variables, like additional programming, may have on recidivism.

It is well documented in the field of criminal justice that additional programming, assessed risk, employment, age, etc. are all associated with an increased likelihood to recidivate (Andrews and Bonta, 2010). So, the above tests, while informative, do not paint a holistic picture of T4Cs role in recidivism or desistance in a moderate to high-risk prison population.

Desistance is a concept related to, but distinct from recidivism: where recidivism is a yes/no one time measurement with no account for changes in crime type/severity, desistance is the concept that cessation of criminal behavior is a learning and behavioral process, and failure (i.e., recidivism) is expected in any learning process and may be a better indicator of efficacy than recidivism (Golden, 2002). So, how would you assess if something “works” if recidivism is to be anticipated? From a desistance perspective you may look at time between release and recidivism, consider age changes and differences, or look at trends of criminal behavior rather than individual instances.

Survival Analyses

To consider desistance, Survival analyses were conducted for all three groups. Survival analysis assesses the expected duration of time to an event, such as death or incarceration. For the purposes of this study, survival analysis considers a return to prison as the event. In figures 1, 2, and 3, the survival curves, where 1= Treated comparing populations and delivery method showed no significant difference in the time to recidivism between control and treatment populations in either timeframe, and no significant difference in time to recidivate between the old and new treatment delivery methods.

A Cox analysis is an adjacent method to survival analysis and has the capacity to consider other hazards (risk factors) that are relevant to the outcome in question. For example, smoking would be an additional hazard for

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death in a survival analysis of people recovering from some medical intervention. For our purposes, risk level classification, length of stay and age at release are all relevant considerations in recidivism. A Cox analysis of the survival models controlling for age at release, RLC, and length of stay also resulted in non-significant coefficients; buttressing the conclusion that there is not a difference in how long an individual is likely to “survive” in the community based on the timeframe or delivery method of T4C.

Figure 1 – Survival Analysis of Old Treatment 2015-17

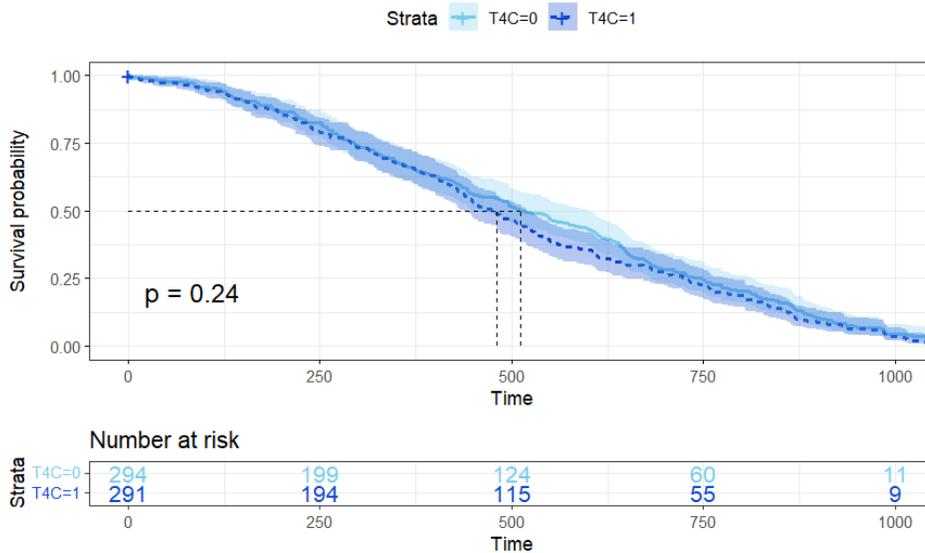
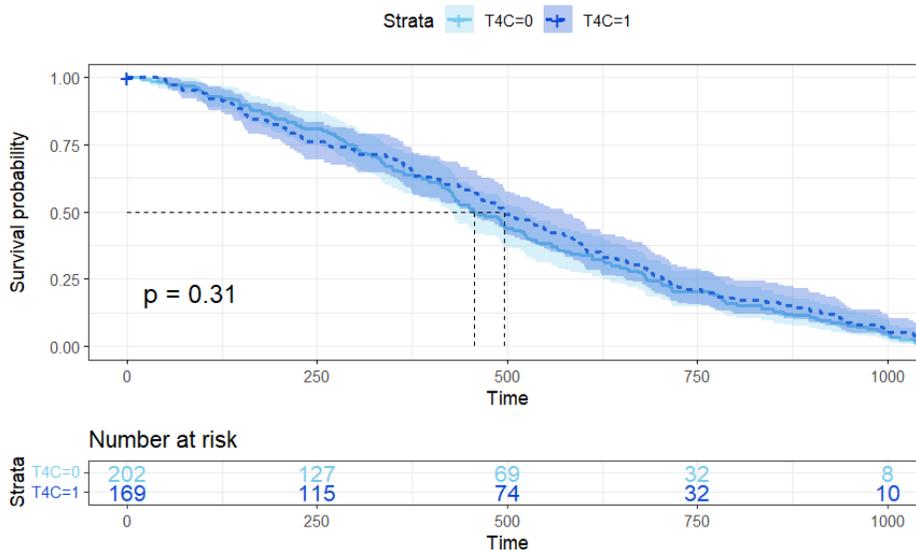


Figure 2. Survival Analysis of New Treatment 2018-19



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Figure 3. Survival Analysis of Delivery Method

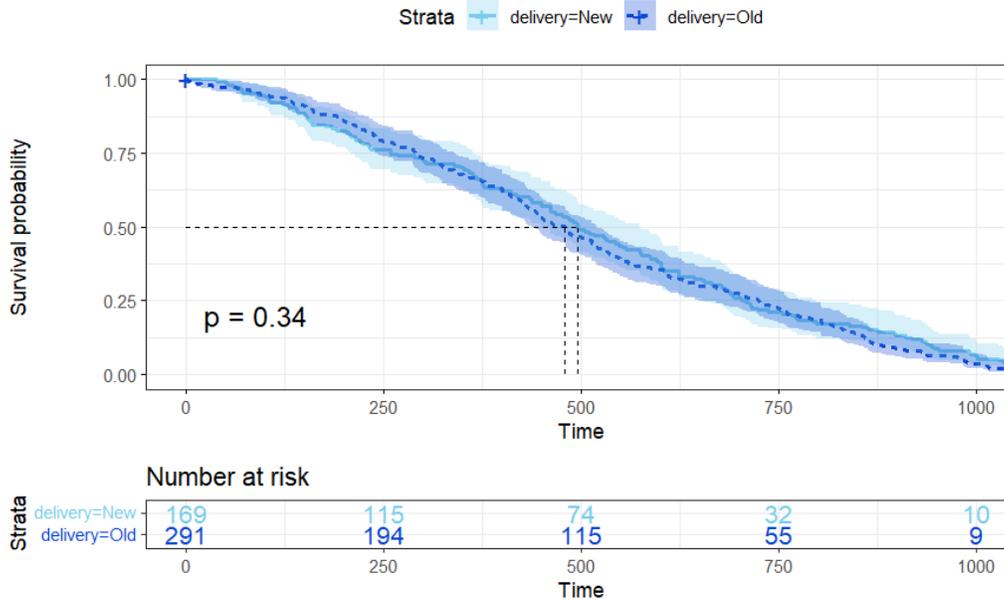


Table 6 – Cox Regression results for Old Delivery (2015-17)

	coefficient	Exp(coef)	SE(coef)	z-value	p-value
T4C	1.118 e-01	1.118 e+00	9.106 e-02	1.221	0.222
Age at Release	-5.115 e-03	9.949 e-01	5.217 e-03	-0.980	0.327
RLC	-3.795 e-02	9.628 e-01	9.935 e-02	-0.382	0.703
Prison Stay Length	-6.156 e-05	9.999 e-01	9.685 e-05	-0.636	0.525

Signif. codes: p < 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 7 – Cox Regression Results for New Delivery (2018-19)

	coefficient	Exp(coef)	SE(coef)	z-value	p-value
T4C	-1.131 e-01	8.931 e-01	1.184 e-01	-0.955	0.340
Age at Release	-4.073 e-03	9.959 e-01	6.303 e-03	-0.646	0.518
RLC	-7.996 e-02	9.232 e-01	1.251 e-01	-0.639	0.523
Prison Stay Length	9.196 e-06	1.00 e+00	1.311 e-04	0.070	0.944

Signif. codes: p < 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

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Table 8 – Cox Regression Results for New vs. Old Treatment

	coefficient	Exp(coef)	SE(coef)	z-value	p-value
T4C	-0.127	0.881	0.108	-1.174	0.241
Age at Release	-0.012	0.988	0.006	-2.020	0.043*
RLC	-0.026	0.974	0.105	-0.253	0.801
Prison Stay Length	-0.00007	1.000	0.0001	-0.569	0.569

Signif. codes: p < 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Regression Analyses

Binomial regressions were the final tool used to assess T4C. Binomial regressions are modified general linear models where the link function is a binomial distribution, and the coefficients indicate a change in the log-odds of a binary outcome when all else is held constant. A binomial distribution is a distribution where there are only two possible outcomes (i.e., recidivism or no recidivism). A link function translates a non-linear relationship to a mathematically linear one so that a linear model can be fit without making off-base estimations. Log odds is an expression of probability. Probability is the likelihood something will or will not happen, odds express the ratio between the probability of success and probability of failure, and log odds is the logarithm of the odds. Log odds are essential to the link function mentioned earlier because the coefficients will be in terms of log odds.

The final regression for each of the groups contained controls for RLC and age at release, two variables strongly associated with likelihood of recidivism. Each groups regression also contained the programming categories that were most strongly associated with recidivism when only considering T4C and programming. Increased dosage and diversity in programming is associated with greater changes to recidivism (Hsieh et.al., 2021) and is necessary to consider when assessing the impact of a single program such as T4C.

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Table 9. Regression Results Old Treatment 2015-2017

Control Variable	Coefficient (SE)	Z-Value	P-value
T4C	-0.16962(0.07994*)	-2.124	0.0336*
RLC	0.67924(0.03654***)	18.589	<2e-16 ***
Age at release	-0.03973(0.00245***)	-16.214	<2e-16 ***
Education programming	-0.20113(0.05181***)	-3.882	0.000104***
Family Focused Programming	-1.01055(0.08409***)	-12.018	<2e-16 ***
Mental Health Life Skills Programming	0.07506(0.04272)	1.757	0.078893
Substance Abuse Treatment	0.52999(0.04337***)	12.219	<2e-16 ***

Signif. codes: p< 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The regression for the old delivery method ultimately controlled for RLC, age at release, substance abuse treatment, and whether they had done any programs during the incarceration in the following categories: family, education, mental health/life skills, and substance abuse treatment. This regression shows the T4C coefficient as -0.1696 and p-value of 0.034 which is statistically significant at the 0.05 level. These figures translate to a statistically significant 18% decrease in the odds of recidivating when controlled for other programming, RLC, age at release, and length of prison stay.

Table 10. Regression Results New Treatment 2018-2019

Control Variable	Coefficient (SE)	Z-Value	P-value
T4C	-0.20138(0.09822*)	-2.050	0.0403*
RLC	0.28729(0.03290***)	8.732	<2e-16 ***
Age at release	-0.01195(0.00221***)	-5.409	6.34e-08***
Family Programming	0.44039(0.06306***)	6.983	2.88e-12***
Substance Abuse Treatment	0.80818(0.04807***)	16.182	<2e-16 ***
CBT/EBP programming	0.61551(0.04303***)	14.306	<2e-16 ***

Signif. codes: p< 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

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The regression for the new delivery method (2018-2019) controlled for RLC, age at release, length of prison stay, Family programming, substance abuse treatment, and non-T4C CBT and evidence-based programs. The T4C coefficient in this regression is -0.2 with a p-value of 0.04, which is statistically significant at the 0.05 level. These figures translate to T4C having a statistically significant 22% decrease in odds of recidivating compared to the control group.

Table 11. Regression Results Delivery Method

Control Variables	Coefficient (SE)	Z-Value	P-value
Dummy for delivery (1=new)	-0.165(0.133)	-1.237	0.216143
RLC	0.518(0.115***)	4.499	4.499 6.82e-06 ***
Age at release	-0.025(0.007***)	-3.587	0.000335 ***
Days T4C to release	-0.001(0.0003*)	-2.567	0.010266 *
Substance Abuse Treatment	0.533(0.132***)	4.028	5.64e-05 ***

Signif. codes: p < 0 '****' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 '' 1

The regression comparing the old delivery method directly to the new delivery method controlled for RLC, days between T4C completion and release, age at release, and substance treatment programming. The T4C coefficient in this regression is -0.165 with a p-value of 0.216, which is not statistically significant. These figures indicate that the new method of delivery decreases the odds of recidivism, but the reduction is not statistically significant.

Overall, the results suggest that participation in T4C programming is reducing recidivism in our target population, benefitting both the incarcerated individuals and Washington communities.

Limitations

Most research on T4C has been done on field populations. The evaluation of samples from a prison environment do not control for other programming effects (ODRC, 2010) or do not evaluate T4C’s impact on recidivism, but rather its impact on post treatment prison behavior and delivery modality (LaPlant, 2010).

This project was unable to evaluate a dosage of T4C other than a “COMPLETED” status due to data entry for program tracking that required us to remove dropouts from the treatment population as well as from the control population. In a similar vein, other programming was controlled for using a binary indicator by program category. A “1” indicated that the individual completed at least one program in that category during their incarceration, an individual with five completed programs in one category would show as a 1, the same as an individual with only one program in that category completed.

Another limitation is the accuracy of our recidivism calculations. While we only sampled from individuals who had completed the T4C program prior to any programming disruptions from the COVID-19 Pandemic, for anyone released after February of 2017 the three years follow-up period contained time during which Washington state courts, corrections facilities, and public health systems were in states of emergency. For 1-2 years after the outbreak of COVID-19, in-person check ins for the field moved to the phone, court was delayed time and again, and non-carceral options were prioritized so that breakouts in prison facilities would be more easily contained.

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Currently, there is a backlog of cases, and many are being dismissed; this likely delayed a return to prison or DOC finding out about any new crimes.

Furthermore, an individual may or may not release to community supervision at the end of their prison stay. While 98.3% and 96.2% of treated and control individuals, respectively, went straight to supervision, it is worth noting that those portions have regular contact with Community Corrections Officers and are required to abstain from activities that in other circumstances are not criminal (i.e., consuming alcohol). Increased contact with corrections personnel and elevated behavioral standards increases the opportunity of being caught violating terms of supervision and decreases the necessary behavioral threshold to be placed back in prison.

Conclusions and Recommendations

Based on the analyses above, completion of T4C programming in a WADOC facility decreases the likelihood of returning to prison within three years following release for individuals of moderate to high risk when compared to a matched population and controlling for other programming participation. Controlling for other program participation is an essential component to understanding the unique impact of T4C.

Taking the literature and findings together, WADOC’s implementation of T4C and other CBT programs should be the primary focus moving forward. And since “each [of the 8] principle[s] is an independent facet of the process.” (Campbell et al., 2018, p.3) we can consider each element individually:

1) Assess Actuarial Risk/Needs

The WADOC was making strides in this area around the time the program was reclassified to the Reentry Division. Prior to the use of the WAONE, a dynamic Risk/Needs assessment tool, T4C eligibility was based on the RLC produced by the Static Risk Assessment-2, which did not account for the dynamic variables that influence risk. The WAONE tool gives a clearer picture of risk at the time of assessment and is ideally readministered every six months. The WADOC is also currently investing in classification tool updates to be more responsive to gender and race.

2) Enhance Intrinsic Motivation

Intrinsic motivation is the motivation from within an individual to do something in their immediate environment, be it putting something away or doing homework to complete a course. While intrinsic motivation originates from within the individual, environmental factors can influence how individuals act and respond.

One method for moving people away from indifference towards an intervention is motivational interviewing (MI). Motivational interviewing, when properly utilized by trained staff, can move incarcerated individuals exhibiting ambivalence toward change towards a level of intrinsic motivation for embracing new coping skills and prosocial cognitive behavioral practices.

A 2005 meta-analysis of studies looking into the efficacy of motivational interviewing found a clinically significant 75% effect in psychological diseases. Just a 15-minute encounter showed an improvement in 64% of the studies and that having multiple MI encounters ensured the effectiveness of motivational interviewing (Rubak et. Al., 2005). A systematic review of studies utilizing motivational Interviewing techniques in corrections populations found that motivational interviewing improved program engagement and retention, enhanced motivation to change, and improved actual behavior (McMurran, 2009). The potential benefits of motivational interviewing to the implementation of T4C and other CBT programs are clear, and it is our recommendation that WADOC leadership consider appropriating resources to train its T4C program facilitators in the methods of motivational interviewing.

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3) Target Interventions using RNR

- a. Risk Principle prioritizes supervision and treatment resources for higher risk offenders
- b. Need Principle targets interventions to criminogenic needs
- c. Responsivity Principle: Be responsive to learning style, motivation, culture, and gender
- d. Dosage: Structure 40-70% of high-risk offenders' time for 3-9 months

The WADOC currently prioritizes supervision and treatment sources to those at the highest risk with the highest needs in the social influences and attitudes/behavioral domains. However, a byproduct of prioritizing high-risk individuals may impede on fidelity to the responsivity principle. For example, the Reentry Division has prioritized individuals uninterested in the T4C program and moved individuals opting into the program further back in line. While this is important to getting the highest risk individuals the treatment they need, it may be counter-intuitive in cases where intrinsic motivation is completely absent.

One possible way to address this issue is to incorporate use of a readiness to change measure before, during, and after the program. Not only would this improve the validity of future evaluations of the program's efficacy by establishing pre- and post- intervention measures, but it may also give the Reentry Division an additional tool when deciding who to admit to the program. For example, if there are limited openings, it may make more sense to admit the person who is at least open to change over the person who is outright hostile to it. It is important to program those who need it the most even if they are resistant and the responsivity principle does not require that the individual be responsive, but that the administration of an intervention is responsive to the individual. Thus, the measurement of readiness in combination with some strategy to meet that individual where they are at would be exactly in line with the responsivity principle.

Since T4C is designed for the highest risk individuals, and surface level opposition comes from something deeper within everyone, and WADOC want to adhere to the need/risk principle, integrating motivational interviewing may bridge the gap between risk/needs and responsivity in this high-risk population. A readiness to change measure would reflect how resistant someone is to the program, but it does not offer the explanatory depth that motivational interviewing does. A combination of readiness to change measures and motivational interviewing is a more nuanced and informative method of targeting treatment. A readiness to change measure would give the facilitators a better idea of how each of their students are approaching the intervention and could potentially inform a decision to have pre-treatment discussions with indifferent and adverse individuals.

Assessment of the most fitting readiness to change tool or measure is beyond the scope of this report, but WADOC mental health services already utilize the University of Rhode Island Change Assessment Scale (URICA) to understand the patient prior to psychotherapy (McConaughy et.al., 1983). This assessment measures the individual through the four stages of change expected in psychotherapy

Lastly, WADOC offers other CBT-based programs that are beneficial to incarcerated individuals. The T4C program consists of 1-2 sessions per week at about 90 minutes each. This does not meet the dosage standard in RNR principles which structure an incarcerated individual's time for 40%-70% of the time for 3-9 months. The WADOC offers a few other research-based programs, and some other CBT programs such as Sex Offender Treatment. Increasing intervention dosage for T4C participants by putting them in multiple evidence and research-based programs at the same time or rapid succession would increase overall dosage to resemble more closely the 40-70% figure recommended by RNR. While WADOC offers various research-based interventions, they are not all based in CBT. Thus, expanding the catalogue of evidence and research-based CBT programs offered at the WADOC in addition to concurrent assignment serves the central goals of the WADOC to positively improve lives and improve their effectiveness in that mission by following research and data-backed practices.

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4) Skill Training with Directed Practice (Use Cognitive Behavioral Treatment Methods)

The structure of T4C includes dramatizations of real-world situations where the central elements are demonstrated to the group by instructors, practiced among group members, and discussed as a class. Improvements on this element is likely to come through improvements to elements 6 and 7 discussed below.

5) Increase Positive Reinforcement

The corrections model is based primarily on punishment rather than reinforcement, and at WADOC the positive “rewards” are assumed at the beginning of the sentence. For example, the Earned Release Date (ERD) assumes all good time is earned and no serious behavioral issues arise; if these assumptions are not fully met the ERD is pushed further and further out making release feel like a moving target. Bad behavior, while it may come with structural or systematic disadvantages, may also come with social or reputational advantages so that the benefit outweighs the cost. Good behavior, on the other hand, is not systematically rewarded at all and may have significant social or reputational disadvantages. In that environment, good behavior is not a compelling option.

Without implementing some form of positive reinforcement in the carceral setting, the basic dynamics of operant conditioning force any intervention in to an up-hill battle, because the positive changes to attitudes and beliefs are challenged rather than supported by an environment designed to primarily punish undesirable behavior.

Currently, the positive affirmations and encouragement offered to participants is contained within the walls of the T4C classroom, not carried through to the cell block or release to community. The WADOC should explore strategies to increase positive affirmation and reinforcements outside of program settings to better support the positive changes achieved in those programs.

6) Engage Ongoing Support in Natural Communities

Finding ways to improve group dynamics within the program on a cohort-by-cohort basis is one way to engage that natural community, but T4C participants who see each other during lessons do not necessarily cohabitate and belong to other natural communities within the prison. There are also natural communities outside of prison. Exploring ways to involve the people who visit offenders participating in T4C may be a way to further engage those communities.

For example, maybe each offender is given 5-10 minutes to call home after each session when they can just catch up and maintain positive social connections and/or discuss the content of that day’s lesson. Such an addition could also be used to introduce positive reinforcement.

7) Measure Relevant Processes/Practices & 8) Provide Measurement Feedback

For WADOC, improving on these two elements go hand in hand; you need to have measures to provide measurement feedback. Above all else, improving data entry and quality in programming data is the most important step in enabling strong and comprehensive analyses. In addition to data improvement, the incorporation of readiness to change and pre-/post-treatment inventories, questionnaires for incarcerated individuals to rate facilitator performance/personal benefit, and questionnaires for facilitators to rate their perceived level of readiness/performance. The results of these measures can inform where facilitators need more support or training, where incarcerated individuals are having more difficulties, and how T4C is impacting them as they move through it.

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Technical Appendix

Figure 1 – Distribution of Age at release in the 2015-2017 Matched Population

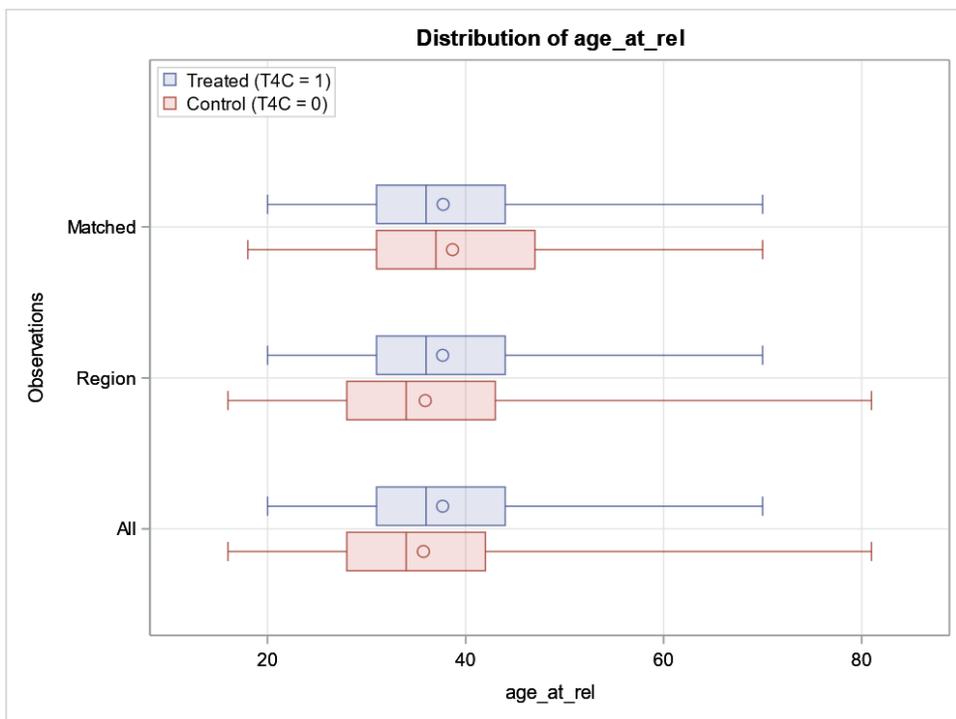
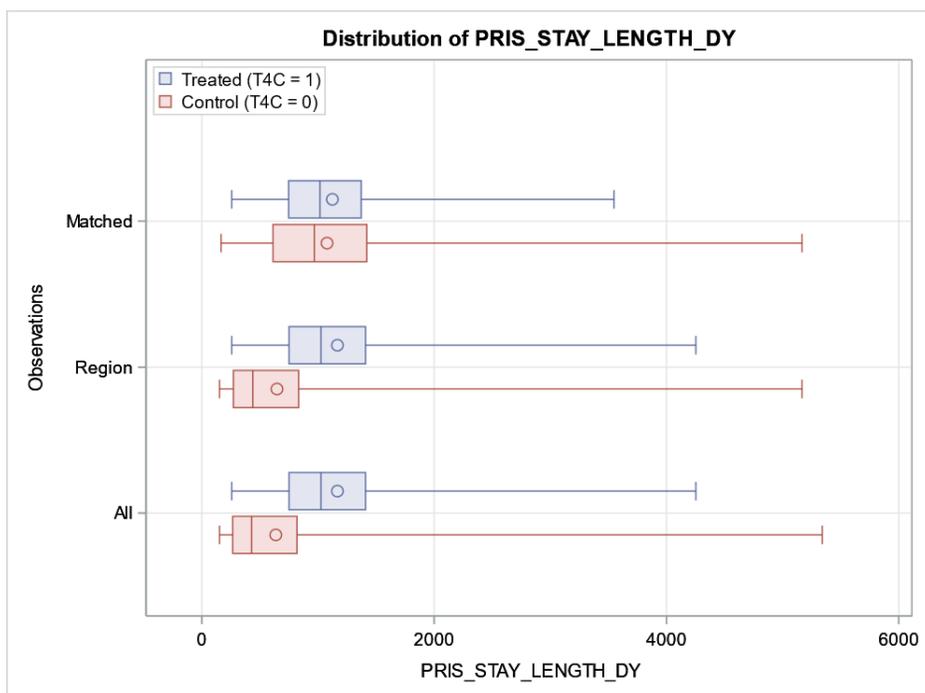


Figure 2 – Distribution of Prison Stay Length in the 2015-2017 Matched Population



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Figure 3 – Distribution of Murder in Criminal History for 2015-2017 Matched Population

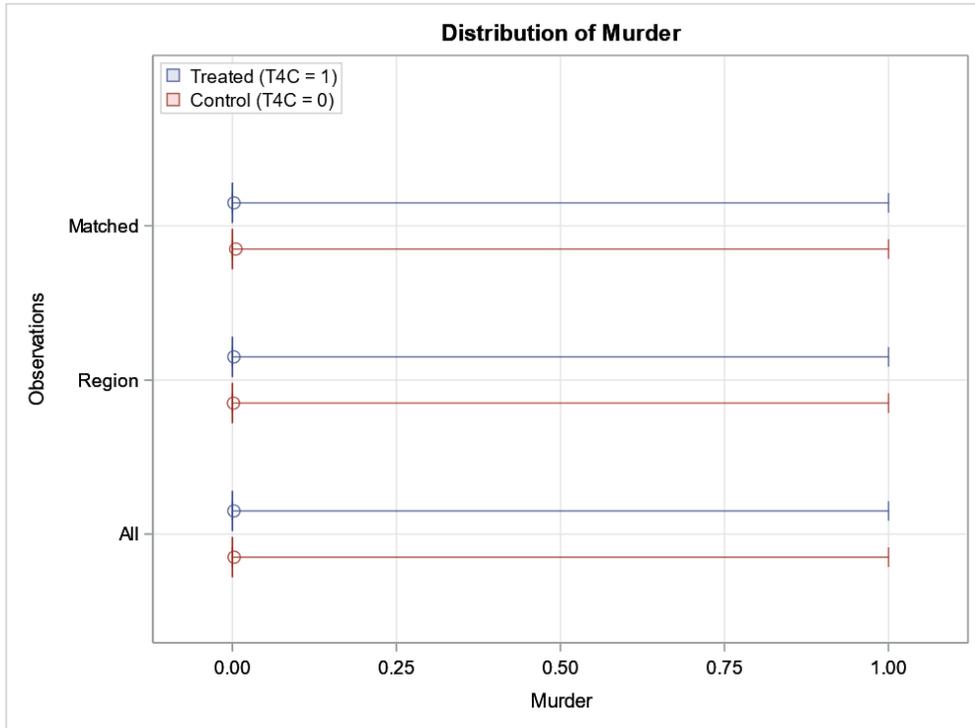
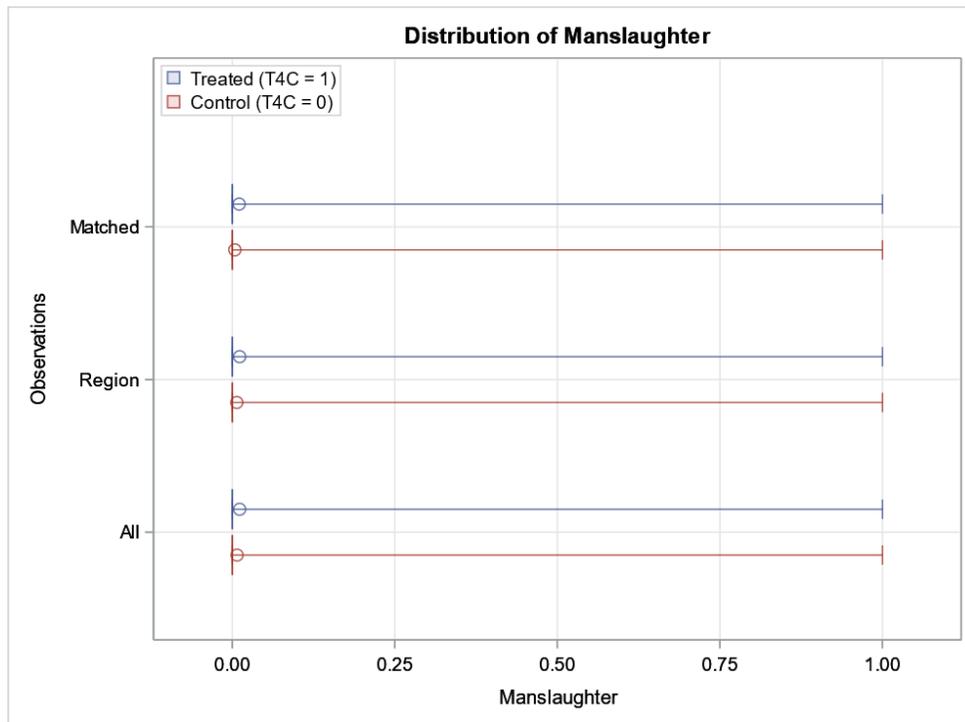


Figure 4 – Distribution of Manslaughter in Criminal History for 2015-2017 Matched Population



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Figure 5 – Distribution of Sex Offense in Criminal History for 2015-2017 Matched Population

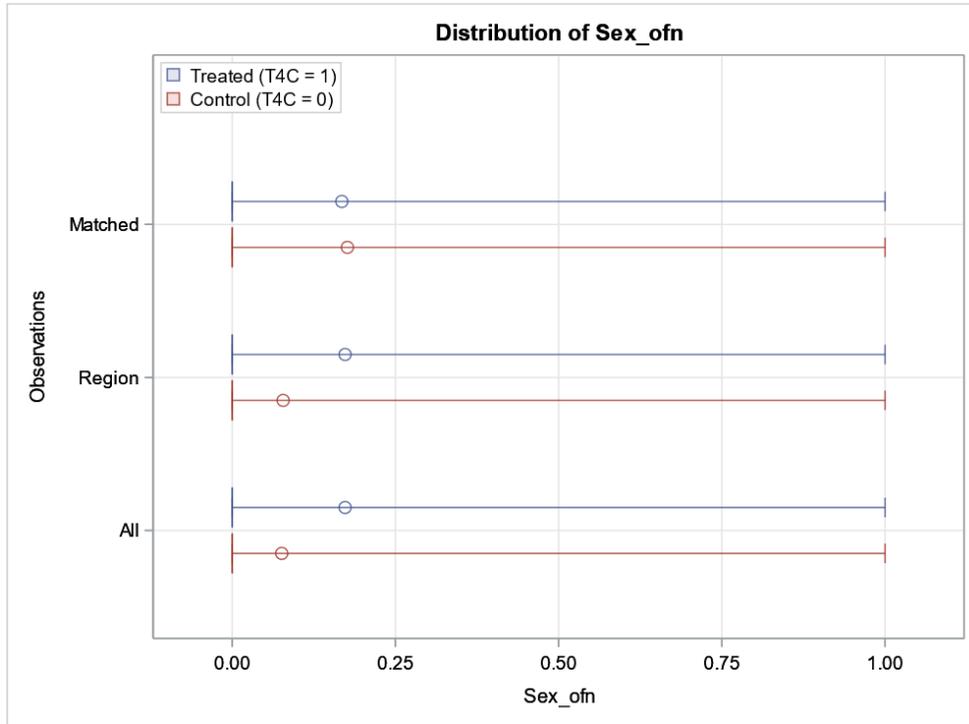


Figure 6 – Distribution of Robbery in Criminal History for 2015-2017 Matched Population

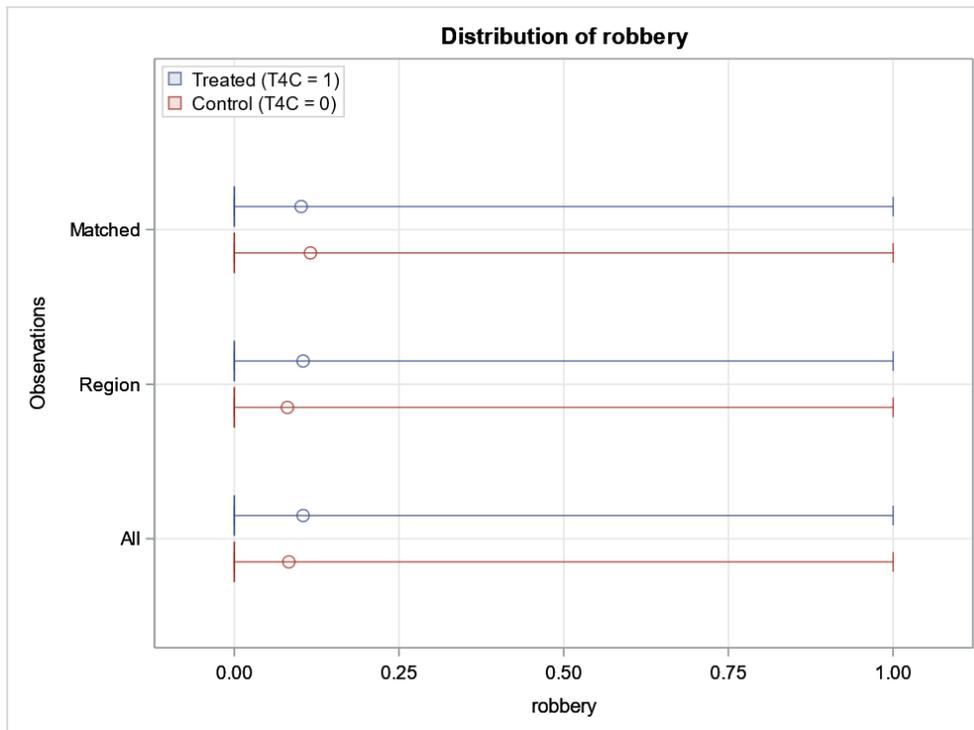


Figure 7 – Distribution of Assault in Criminal History for 2015-2017 Matched Population

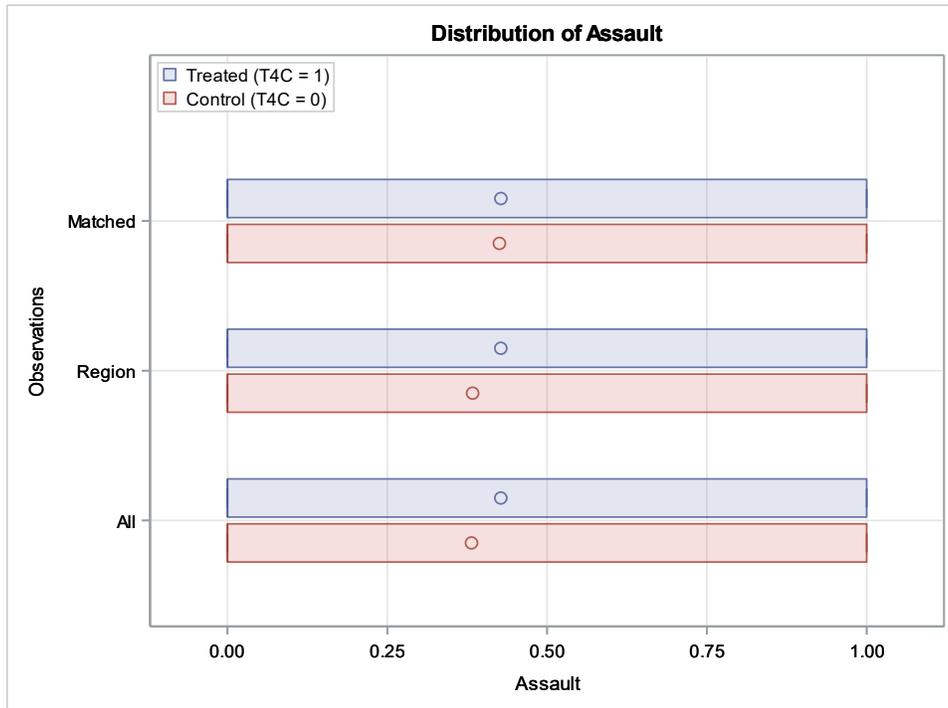
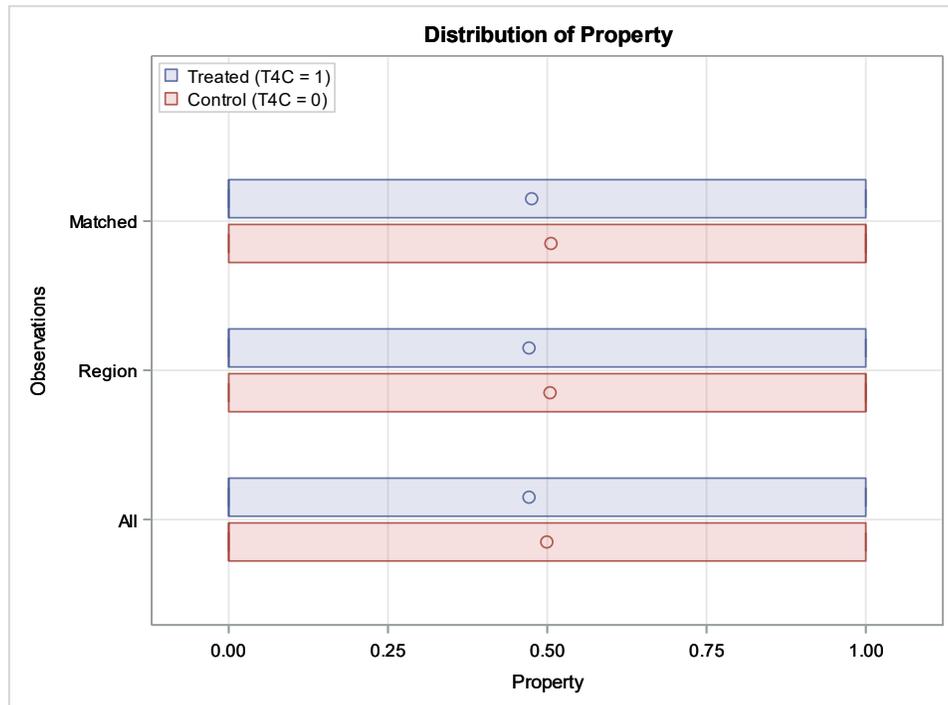


Figure 8 – Distribution of Property in Criminal History for 2015-2017 Matched Population



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Figure 9 – Distribution of Drug in Criminal History for 2015-2017 Matched Population

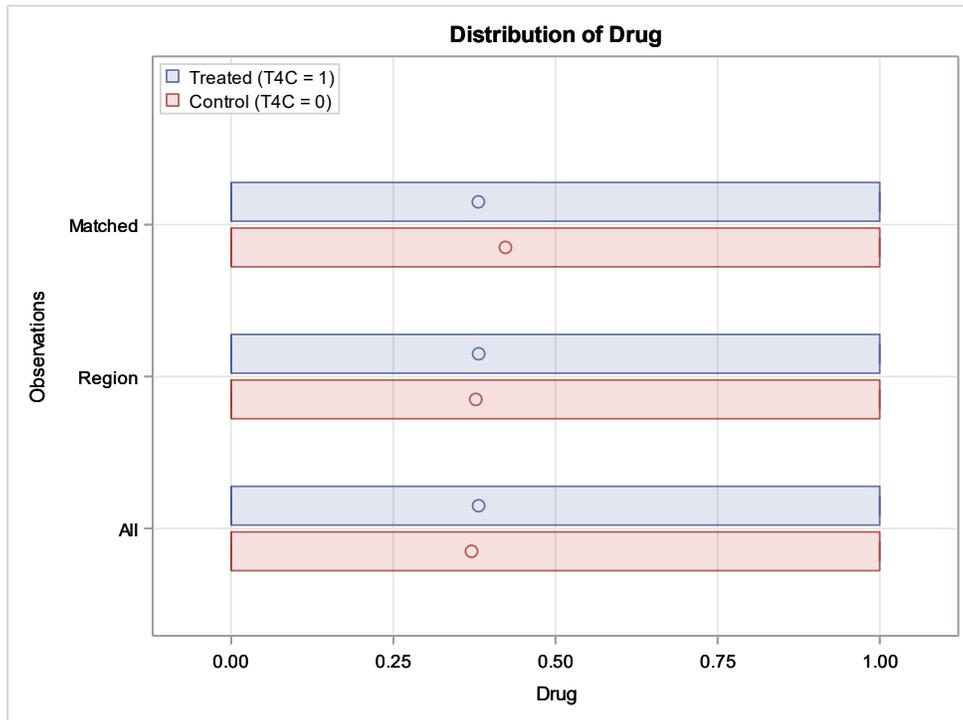
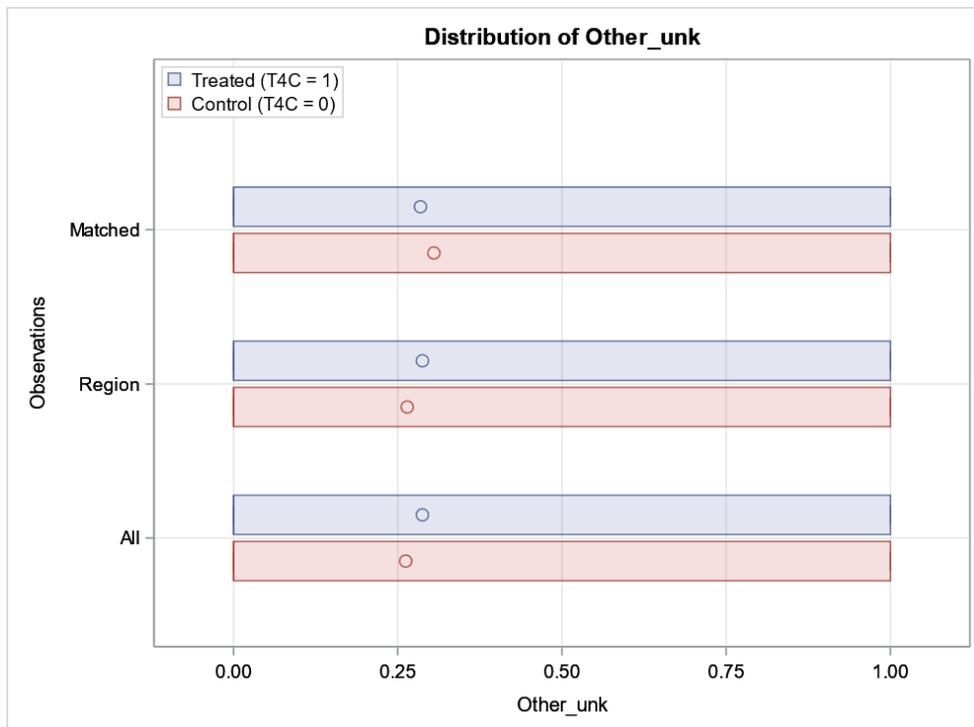


Figure 10 – Distribution of Other/Unknown in Criminal History for 2015-2017 Matched Population



Below are the distributions for the 2018-2019 population on variables used for Propensity Score Matching. DOC 500-RE004 Rev. 4/2023

Figure 11 – Distribution of age at release for 2018-2019 Matched Population

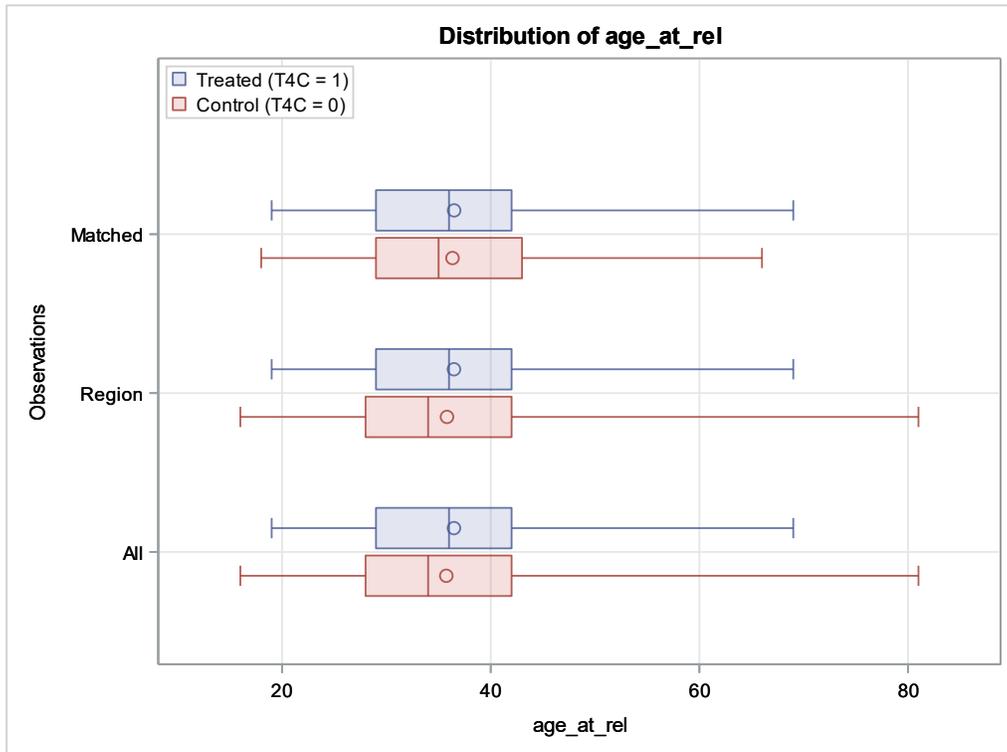
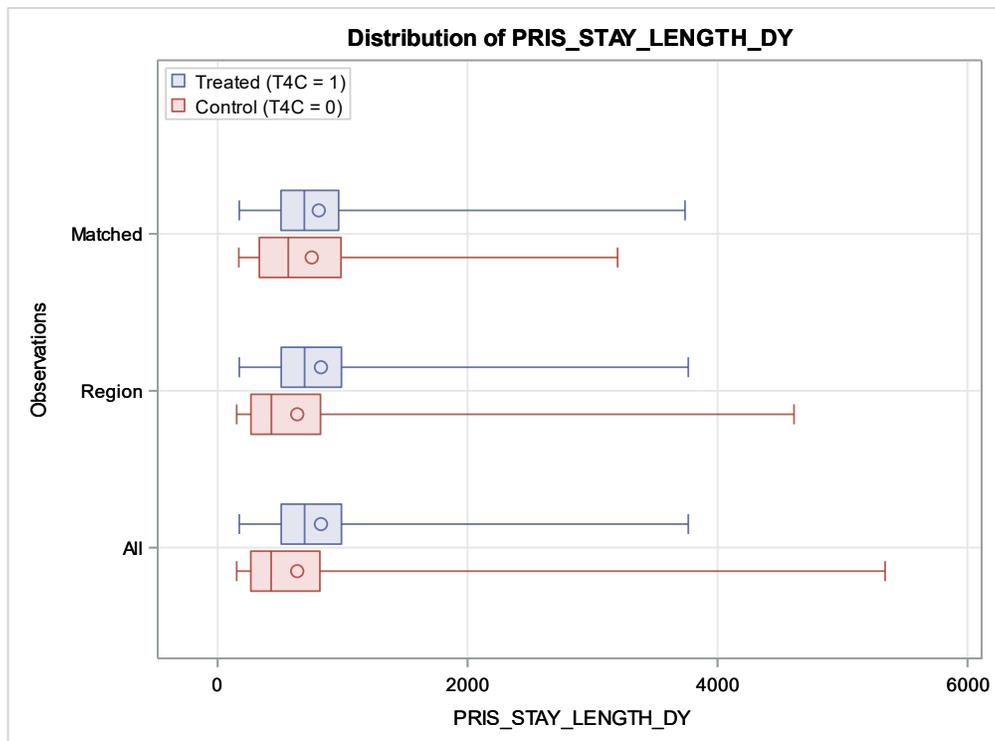


Figure 12 – Distribution of Prison stay Length for 2018-2019 Matched Population



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Figure 13 – Distribution of need domain for 2018-2019 Matched Population

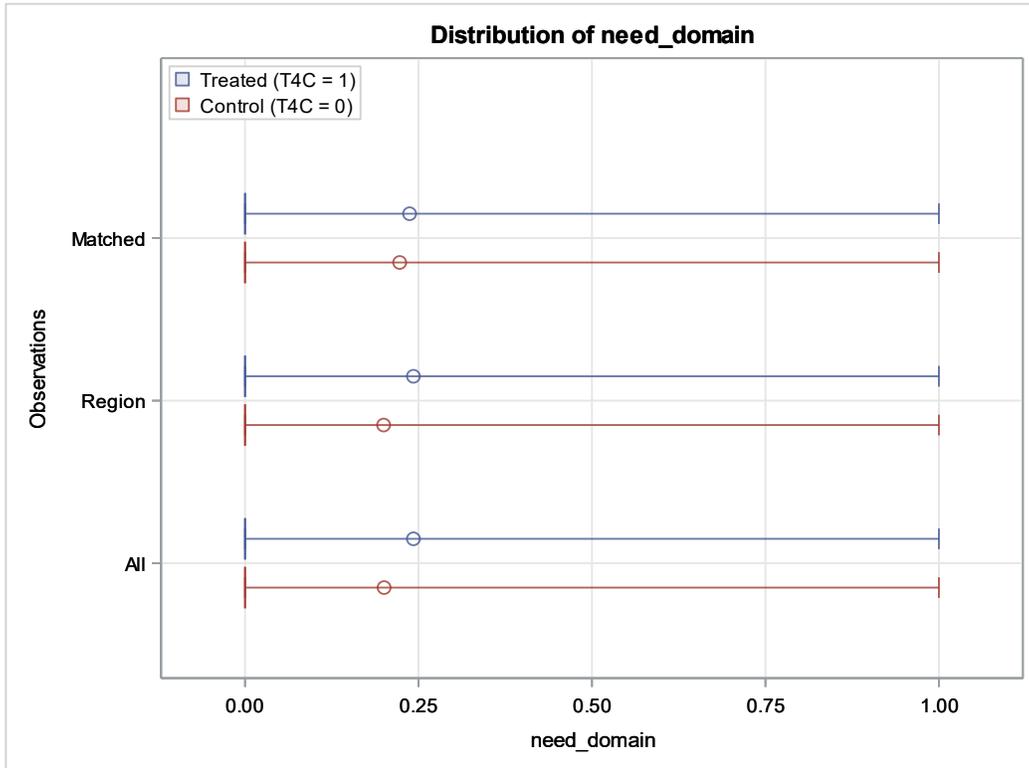


Figure 14 – Distribution of Murder in Criminal History for 2018-2019 Matched Population

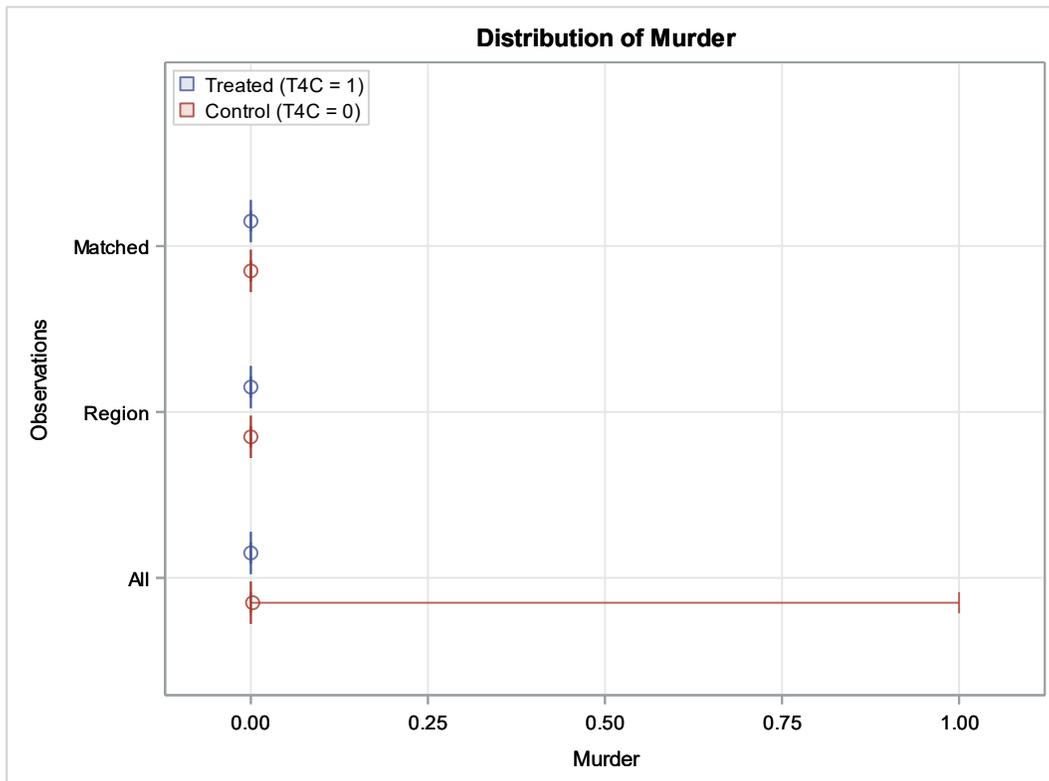


Figure 15 – Distribution of Manslaughter in Criminal History for 2018-2019 Matched Population

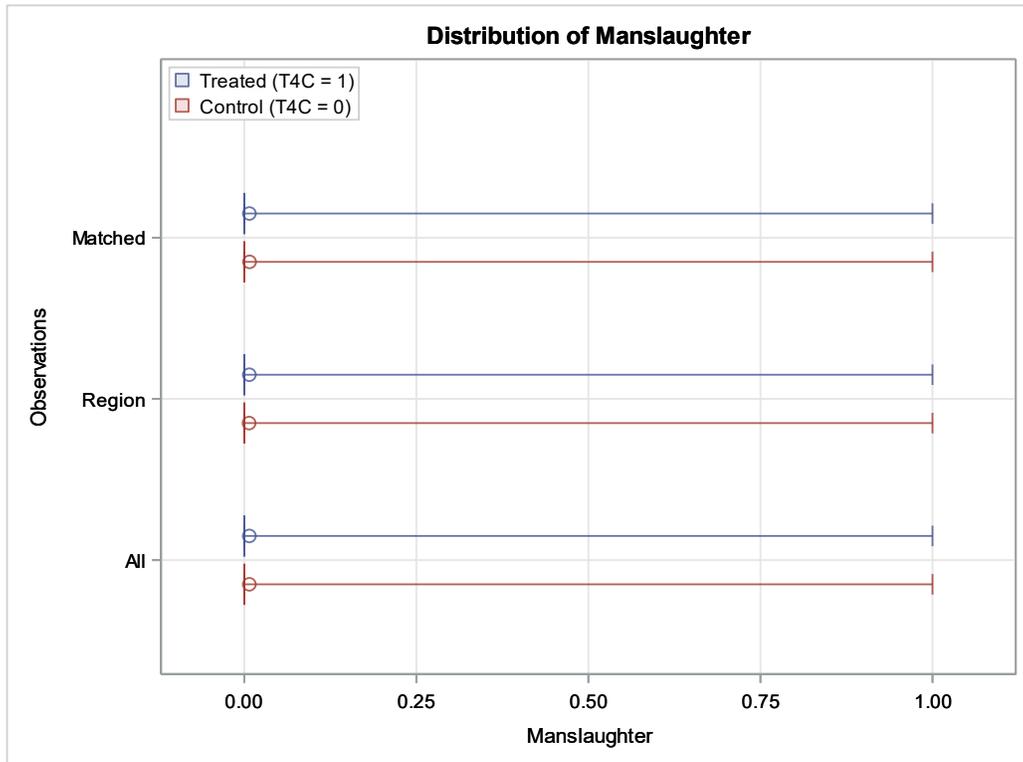
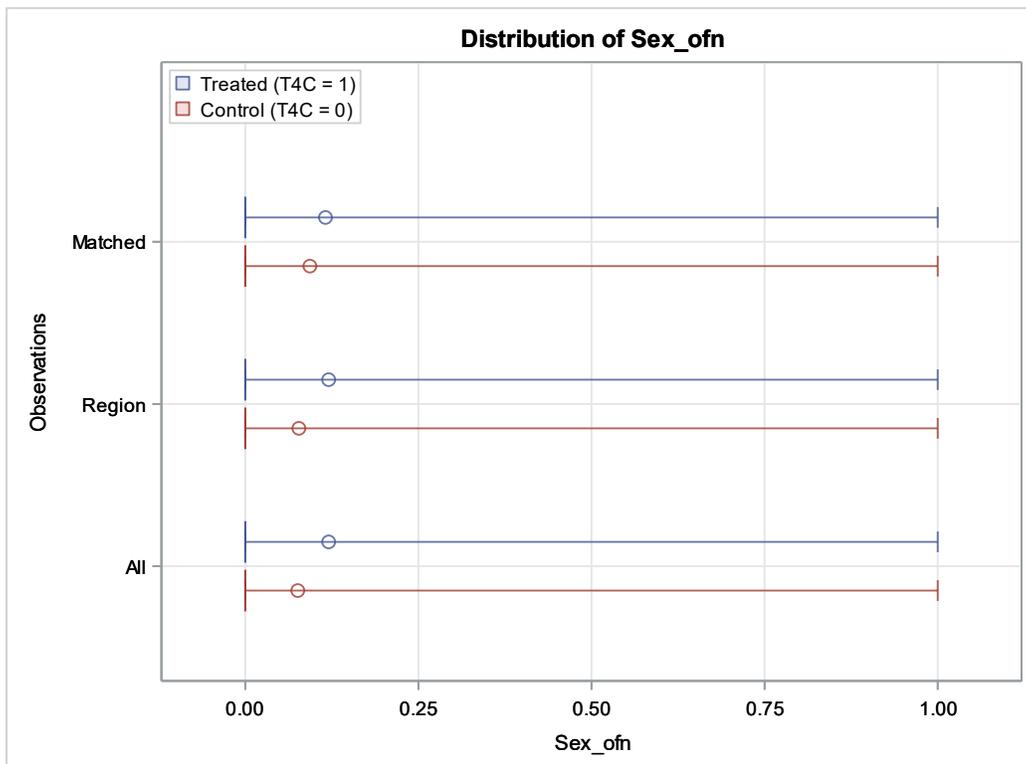


Figure 16 – Distribution of Sex Offense in Criminal History for 2018-2019 Matched Population



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Figure 17 – Distribution of Robbery in Criminal History for 2018-2019 Matched Population

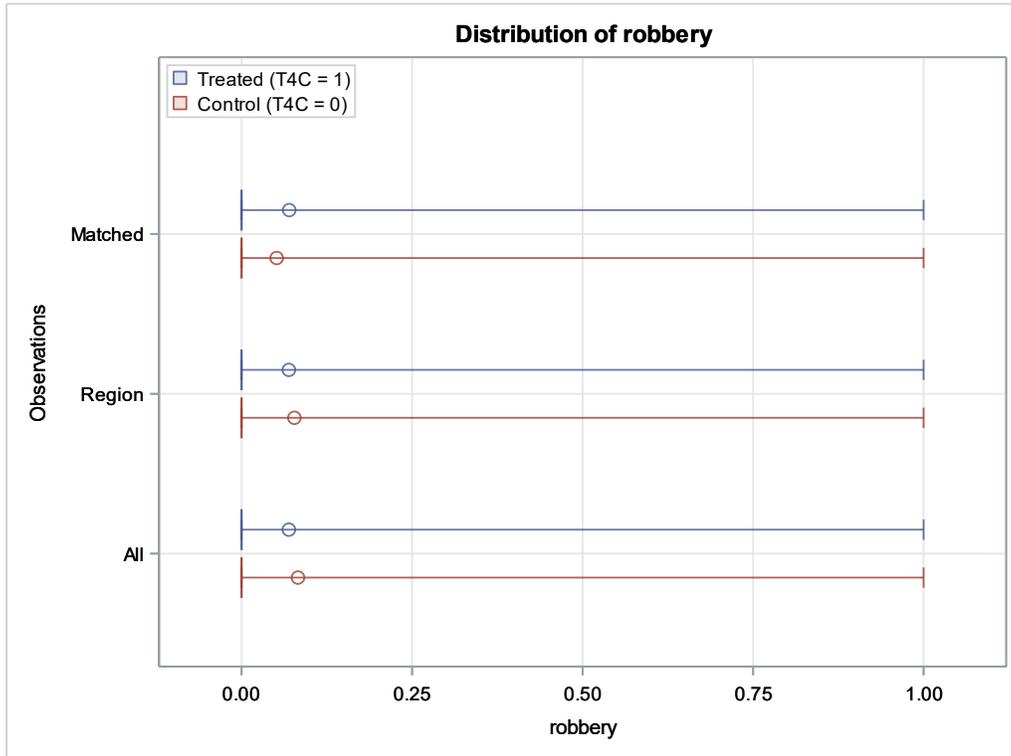


Figure 18 – Distribution of Assault in Criminal History for 2018-2019 Matched Population

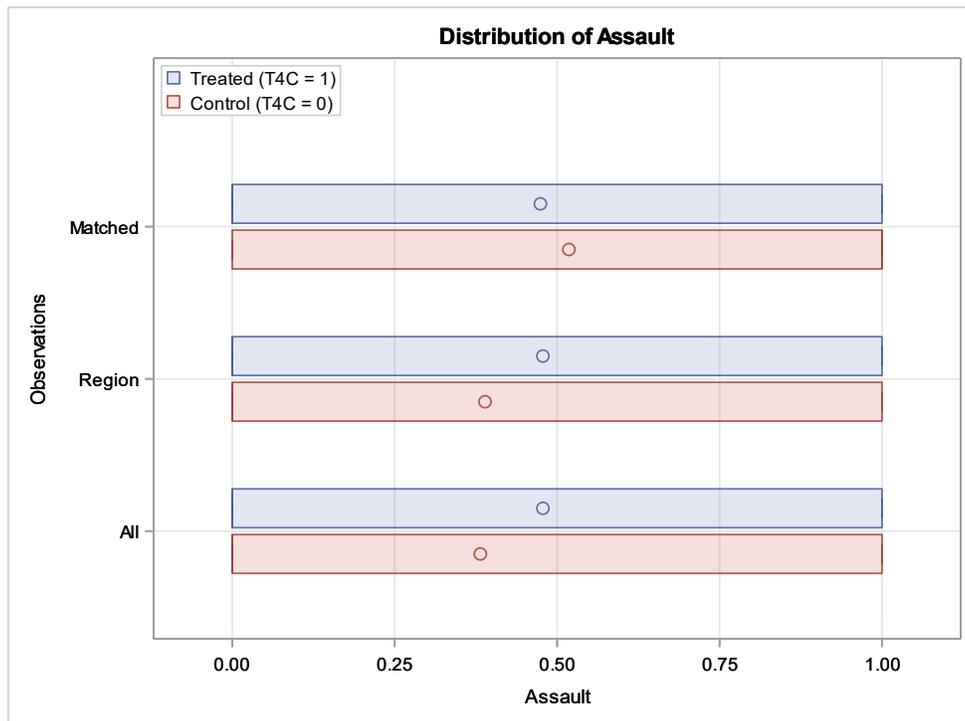


Figure 19 – Distribution of Property in Criminal History for 2018-2019 Matched Population

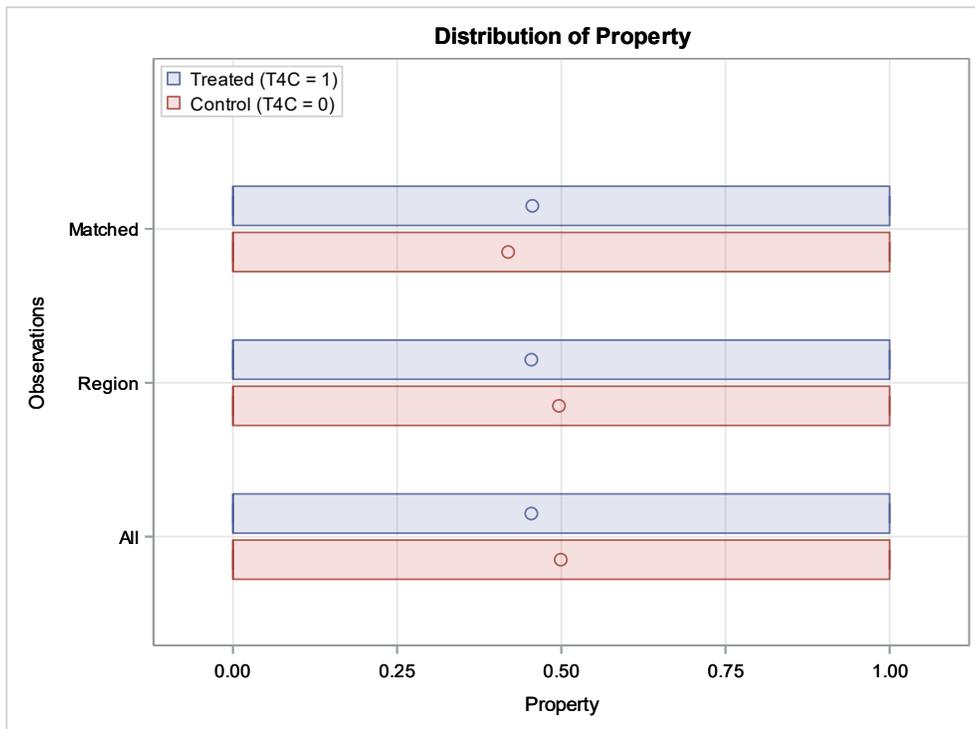
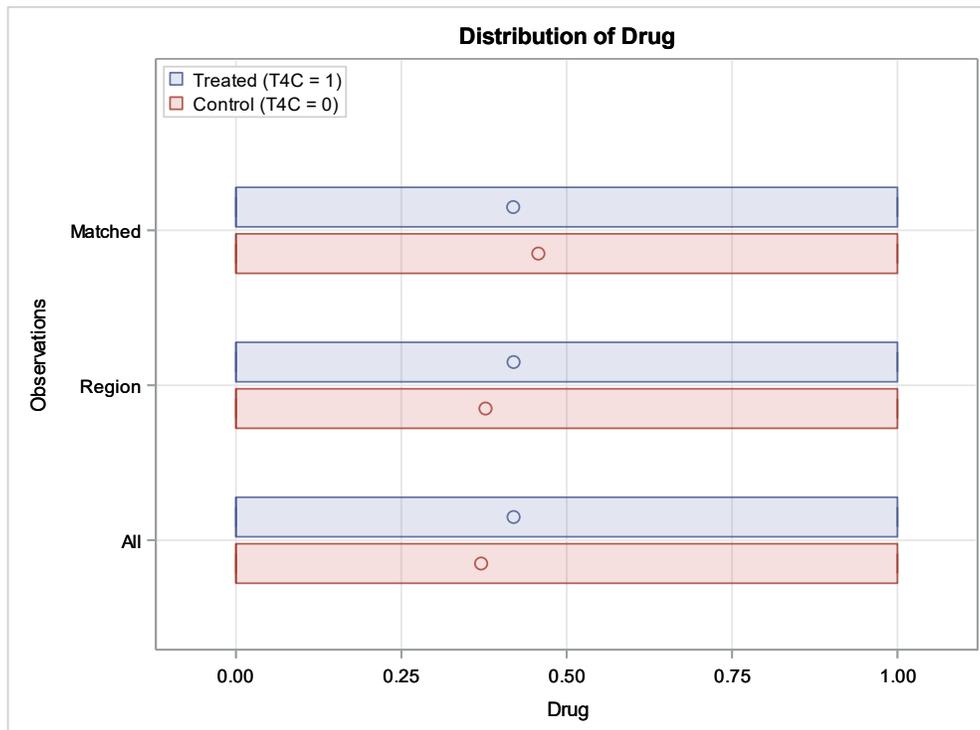


Figure 16 – Distribution of Sex Offense in Criminal History for 2018-2019 Matched Population



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Figure 17 – Distribution of Other/Unknown in Criminal History for 2018-2019 Matched Population

