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Executive Summary

Substance use disorders (SUD) are very prevalent and costly in the United States and New Mexico. Over 20 million individuals in the US meet diagnostic criteria for SUD and over 65 thousand US residents died from drug opioid overdose in 2020. It is well known that there is a strong correlation between SUD and incarceration. National studies have found that on average two thirds of prisoners have SUD and approximately 30% of inmates report having an opioid use disorder (OUD). There is growing momentum nationally to incorporate SUD, particularly OUD treatment, into incarceration systems and numerous studies have found that providing medication for opioids use disorder (MOUD) in incarceration systems is clinically effective. Since 2005, there has been a Methadone Maintenance Treatment (MMT) continuation program within the Metropolitan Detention Center (MDC) where individuals who were already receiving community-based treatment could continue their treatment within the jail. Prior work has found that this program was associated with reduced crime. In 2017 this program was expanded and started providing treatment to individuals who had not been receiving methadone in the community prior to incarceration. In this study we evaluate the impact of this treatment program. Data was collected from numerous different sources, linked, thoroughly cleaned, and a difference-in-difference empirical strategy is used. Robust evidence is found that MMT initiation reduced reincarceration. Our main results find that MMT initiation is associated with a per-person reduction in 19 incarceration days in the one-year period after jail-based MMT was received. We also find evidence confirming prior studies that found MMT continuation reduces recidivism. We find that jail-based MMT continuation is associated with a per-person reduction in 31 incarceration days in the one-year period post release. Also, a heterogenous treatment effect is found where individuals that received jail-based MMT for longer periods of time had larger reductions in reincarceration. Individuals who received MMT initiation for 70 days or more were associated with 22 fewer reincarceration days and individuals that received MMT continuation were associated with 60 fewer reincarceration days.

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1. Introduction

Crime is incredibly costly. As of 2021, 1.8 million people in the US were incarcerated with the US having the highest incarceration rate in the world (Kang-Brown et al., 2021).¹ A substantial driver of crime in the US is recidivism. It is estimated that 62% of individuals released from state prisons are rearrested within three years, 71% are rearrested within 5 years, and 83% of prisoners are rearrested within 9 years (Alper et al., 2018; Durose & Antenangeli, 2021). Overall, the economic cost of crime in the US has been estimated to be approximately 2.6 trillion dollars per year (Miller et al., 2021).

Recently, the incarceration rate in the US has been falling. From 2009 to 2019, the incarceration rate has declined by 1% per year and in 2019 the number of incarcerated people in the US was at its lowest level since 2003.² While crime and incarceration have generally declined in the US, New Mexico has a higher burden of crime than other states. New Mexico has the 2nd highest crime rate in the US, with 3,945 crimes per 100,000 population.^{3, 4} Also, New Mexico has the 2nd highest rates of property and violent crime in the US.⁵

Substance use disorders (SUD) are also very prevalent and costly in the US and New Mexico. Over 20 million individuals (8% of the population) meet diagnostic criteria for SUD and while causality has not been established there is a substantial correlation between SUD, mental health, and crime (Center for Behavioral Health Statistics and Quality, 2017). Also, SUD is

¹ As reported from Prison Policy Initiative (<https://www.prisonpolicy.org/global/2021.html>, last accessed 03/22/2022)

² Based on the statistics provided by US department of Justice, Bureau of Justice Statistics (<https://bjs.ojp.gov/sites/g/files/xyckuh236/files/media/document/cpus19st.pdf>, last accessed 3/30/2022)

³ Data accessed from Prison Policy Initiative, (<https://www.prisonpolicy.org/global/2021.html>, last accessed 03/25/2022)

⁴ As of 2019, an estimated 733 people per 100,000 population were incarcerated in New Mexico, which is higher than the average incarceration rate in the US (644 per 100,000 population)

⁵ Data from Federal Bureau of Investigation Uniform Crime Reporting (UCR), (<https://ucr.fbi.gov/crime-in-the-u.s/2019/crime-in-the-u.s.-2019/topic-pages/tables/table-5>, last accessed 03/24/2022)

prevalent in incarceration systems. Studies have found that at least two thirds of inmates have SUD (Belenko & Peugh, 2005; Gunter et al., 2008; Karberg & James, 2005; Peters et al., 1998; Proctor et al., 2019; Wagner & Rabuy, 2017) and approximately 30% of inmates report having an opioid use disorder (OUD) (Proctor et al., 2019). Also, individuals with SUD were more likely to have extensive criminal records (Bennett et al., 2008; Pierce et al., 2017).

To reduce SUDs and their associated economic costs there is growing momentum to incorporate SUD treatment into incarceration systems. Recently, presidential addresses have called for reforms to make America’s criminal justice system “smarter, fairer, and more effective.” The FIRST STEP Act was signed into law in 2018 to improve the conditions of prisons and reduce the risk that prisoners will recidivate upon release. Also, in 2017 the National Sheriffs’ Association pledged to address recidivism by incorporating SUD treatment into protocols (Klein et al., 2018).

SUD treatment is increasingly being implemented into incarceration systems nationally, particularly providing medication for opioid use disorders (MOUD) in prison systems. In some ways, New Mexico has been on the forefront of providing incarceration-based MOUD.⁶ Since 2005, there has been a Methadone Maintenance Treatment (MMT) program within the Bernalillo County Metropolitan Detention Center (MDC). For a decade, inmates who had been receiving MMT prior to incarceration were able to continue MMT within the jail. Prior work has found that MMT continuation was associated with reduced crime and is cost effective (Horn et al., 2020; Westerberg et al., 2016). Thus, there is evidence that jail-based MMT is an economically and socially valuable mechanism to reduce crime.

⁶ However, New Mexico is one of only a few states that has not implemented MOUD in its prison system.

However, while MMT continuation is important, it is limited in that it is only able to reach inmates that were already receiving treatment before incarceration. Instead, MMT initiation has the potential to reach a far greater number of inmates and thus have a much greater impact. Recently, in 2017, the MDC began initiating inmates on MMT, which allows us to study the impact of MMT initiation on crime.

To evaluate the impact of jail-based MMT, a quasi-experimental study design was used that utilized information about jail-based MMT participants and a control group of inmates who reported using opioids but did not participate in the MDC MMT program. Data was collected from four different data sources: a) MDC MMT participant information from Recovery Services of New Mexico (RSONM), b) MDC MMT treatment information from RSONM, c) health-screener information from the MDC, and d) booking information from the MDC jail management system and publicly available court datasets. These datasets were linked and thoroughly cleaned, and a difference-in-difference (DD) method was implemented to evaluate the impact of methadone initiation and continuation at MDC.

Overall, this analysis provides evidence that the MDC MMT initiation and continuation programs lead to significantly lower reincarceration days for inmates who participated in treatment than inmates who did not participate in the methadone treatment. Our main results suggest that inmates who participated in MMT initiation and continuation had approximately 19- and 31-days lower reincarceration days, respectively, in the one-year period after release. Further, our analysis finds that individuals who received MMT for a longer duration exhibit a greater reduction in incarceration days than individuals with shorter duration of treatment at MDC. Individuals who were initiated on MMT had approximately 22 fewer reincarceration days and individuals who were continued on MMT had approximately 60 fewer reincarceration days.

2. Background on incarceration-based SUDs treatment

2.1. The opioid epidemic and incarceration based MOUD treatment

Currently, the US is in the midst of an opioid epidemic, which has been described as a national emergency (Gostin et al., 2017). In 2020, a total of 68,630 US residents died from drug opioid overdoses, a nearly fivefold increase in annual opioid overdose deaths since 2000 (Wilson, 2020).⁷ This increase in opioid mortalities is in large part due to a substantial increase in synthetic opioid use (Han et al., 2019). In 2020, fentanyl and its analogs were associated majority (approximately 80%) of opioid overdose deaths in the US.⁸

To help individuals deal with the medical aspects of OUD, MOUD is increasingly being integrated into residential and incarceration-based treatment approaches. Generally, there are three different medications that are applied in incarceration systems. Methadone is a synthetic opioid, administered daily, which prevents opiate withdrawal and mitigates cravings for other opioids. Buprenorphine is a partial opioid agonist, also administered daily, that comes in abuse-deterrent formulations that reduces risk of overdose. Naltrexone is an opioid antagonist that blocks opioid receptors. Typically, extended-release naltrexone (vivitrol) is administered as an intramuscular gluteal injection, at or right before release.

Generally, incarceration-based MOUD has been found to be effective from a clinical perspective. Meta analyses have found incarceration based MOUD to be effective in reducing opioid use and increasing community treatment engagement and retention (Bahji et al., 2020; Malta et al., 2019; Moore et al., 2019). It is well known that the potential for overdose death is

⁷ Information gathered from National Institute on Drug Abuse (NIDA), (<https://nida.nih.gov/drug-topics/trends-statistics/overdose-death-rates>, last accessed 05/11/2022)

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very high immediately upon release and MOUD has been found to reduce opioid overdose deaths post release (Bahji et al., 2020). Also, studies have found MOUD is associated with an increase in viral suppression for inmates with HIV (Springer et al., 2018). Recently, a successful incarceration-based MOUD program in Rhode Island was found to increase engagement in treatment, reduce heroin and injection drugs, and reduce post-incarceration death (Brinkley-Rubinstein et al., 2018; Green et al., 2018) and a recent multi-site study (Lee et al., 2016) found that extended-release naltrexone was effective in delaying relapse.

However, very recently there has been a growing number of studies that have found MOUD programs to be less successful. A randomized control trial in a Baltimore Detention Center (Schwartz et al., 2021) found no significant impact of methadone maintenance on opioid use and another study (Farabee et al., 2020) found no impact of extended-release naltrexone on substance use.

2.2. Implementation of MOUD in incarceration systems

The landscape of MOUD treatment in incarceration systems is changing quickly across the country. Only a decade ago there was very little medication-based treatment in US incarceration systems and most incarceration systems required complete withdrawal from all opioids including medications. Today, in part due to significant empirical findings, there is increased momentum to continue and perhaps introduce inmates onto MOUD. The most common type of jail-based MOUD is extended-release naltrexone. The major advantage of this type of treatment is that it is a shot and administered upon release with little potential for diversion or abuse. As of 2020 approximately 300 of 3,200 jails in the US offered naltrexone to inmates at release. Methadone or buprenorphine are less common in US jails - as of 2020

approximately 120 jails in the US provided either methadone or buprenorphine (Vestal, 2020). Also, MOUD has been implemented in 10 state-run prisons in California, Connecticut, Delaware, Hawaii, New Jersey, Pennsylvania, Rhode Island, Vermont, Washington, and West Virginia.

2.3. The economic impact of incarceration based MOUD

It is well known that clinically-effective SUD interventions can have substantial benefits to society. Numerous SUD treatment modalities have been found to produce positive economic effects (Cartwright, 2000; Doran, 2008; Murphy & Polsky, 2016; Schori, 2011). It is estimated that, for every dollar spent on SUD treatment, an excess of 12 dollars are returned in economic benefits (Volkow, 2011). SUD treatment has been found to reduce crime (Wen et al., 2014). Also, a large evidence-based literature demonstrates that treatments incorporating community-based MOUD reduces drug use and criminal activity (Campbell et al., 2007; Perry et al., 2015).

Although the evidence is slightly more mixed, incarceration-based SUD treatment has also been found to have benefits that outweigh its costs. Prior work has found that diversion programs (Collins et al., 2010; Harvey et al., 2007; Logan et al., 2004; Shanahan et al., 2004), therapeutic communities (McCollister et al., 2003; McCollister et al., 2004; Zhang et al., 2009, 2011), and community-based programs (Zarkin et al., 2015; Zhang et al., 2006) are effective from an economic perspective. However, surprisingly there is little empirical evidence that incarceration-based MOUD impacts crime or criminal activity in the US. Meta analyses by Moore et al., (2019) and Bahji et al., (2020) largely found no significant impact of incarceration-

based MOUD on crime or reincarceration.⁹ Since 2009 almost every study evaluating the impact of incarceration-based MOUD has found no statistically significant impact of incarceration-based MOUD on crime (Farabee et al., 2020; Gordon et al., 2017; Kinlock et al., 2009; Lee et al., 2016; Magura et al., 2009; McKenzie et al., 2012; Moore et al., 2018; Murphy & Polsky, 2016; Rich et al., 2015; Schwartz et al., 2021). Although, there has been some evidence in the rest of the world that MOUD reduces incarceration. Studies have found MOUD reduced reincarceration in Australia (Larney et al., 2012) and MMT was found to delay a return to incarceration for individuals who continued treatment in the community in Canada (Farrell-MacDonald et al., 2014; Macswain et al., 2014).

3. The MDC MMT program

In this study, we evaluate the impact of jail-based MMT provided at the Metropolitan Detention Center (MDC) of Bernalillo County, New Mexico. An MMT program has operated as a public health clinic within the MDC since November 2005. For over fifteen years, this clinic has operated as an MMT continuation program where inmates were allowed to continue MMT if they were engaged in community-based MMT at the time of incarceration. In prior work, this MMT continuation program has been found to be effective. Westerberg et al. (2016) found that participants in this program had a significantly longer time until rebooking. Horn et al. (2018) found that the economic costs of this program were comparable to community based MMT continuation and found that this program reduced crime and was cost effective (2020).

⁹ Bahji et al., (2020) conducted meta-analysis for MOUD in criminal justice setting that utilizes oral and extended-release naltrexone. The authors find significant reduction in reincarceration rates for oral naltrexone, but no statistically significant effect for extended-release naltrexone.

In 2017, the MDC MMT program was expanded and began to initiate inmates who had not been receiving methadone in the community. Recovery Services of New Mexico (RSONM) provides Opioid Treatment Program (OTP) for inmates incarcerated at the MDC. To be eligible to receive medication assisted treatment at MDC, a client must meet DSM V criteria for OUD.¹⁰ The MDC provides treatment using both MOUD and supportive behavioral health counselling.

4. Data

For this study, we collected information for participants of the MDC MMT program, and a comparison group, of inmates that self-reported opioid use (that did not receive treatment) between February 1st, 2019 and April 30th, 2020. To identify inmates that received treatment at the MDC a list of names of participants in the methadone program were obtained from RSONM. These data contained patient name, identification number, treatment start date, and the type of treatment (MMT initiation, MMT continuation and courtesy dose). A separate dataset was also provided by RSONM that contained further information on number of doses, treatment start and end dates, the practitioner who provided treatment, and the social security number and year of birth for participants.

Pre- and post-crime data were collected using the MDC jail management system and publicly available court datasets. These data contain information on entry, release, and the highest charge for each booking event for everyone who entered the MDC. Recidivism data was collected for a three-year period before the indexed booking event and one year after the indexed

¹⁰ There are also several other criteria that may exclude a client from participating in MDC medication assisted treatment. These include, (1) individual's medical or psychiatric conditions or impairment that preclude treatment, (2) refusal to sign a release of information for consultation with MDC health care, (3) refusal to sign a release of information for support consultation with individual's outpatient clinic, (4) disapproval from parole officer on methadone treatment for parole violators, and (5) assessment of health care staff that provision of medication assisted service is unlikely to benefit individuals.

booking event.¹¹ Using this information, crime outcome variables were created for (1) the total number of offenses, (2) total length of stay and (3) highest crime classification for everyone in our sample.

Health information was obtained about individuals incarcerated in our study from the MDC health screener. For background, when each individual is entered into the MDC system, they are interviewed by the MDC health care staff using a screening assessment. The screening assessment is used to determine the physical and mental health status of inmates and whether inmates are currently enrolled in a methadone program. The health screener data contains self-reported information about prior substance use and treatment engagement with methadone or suboxone. The health screener data was also used to construct a comparison group of individuals that reported prior substance use but did not receive MMT in the jail.

To link MMT participant information and crime data social security numbers were used. Because social security information was not available in the health screener data, these data were linked with the rest of our data using probability matching. This technique uses available information to link records across multiple administrative datasets.¹² Specifically, we utilize name and date of birth to generate probabilities that records across administrative data sets were for the same individuals.¹³ Also, because this is jail data, another important consideration is if an

¹¹ Indexed booking event for treated individuals identified as the booking event that coincides with treatment date. For comparison, first booking record between 02/1/2019-04/30/2020 utilized as indexed booking event to gather pre and post crime data.

¹² Probability matching can be useful tool is linking records across multiple administrative datasets when unique identifier is not available. This matching technique utilizes information such as name and date of birth to generate weights to indicate the probability that records in different data are for the same individual.

¹³ The likelihood of matches (probability) was manually examined to define threshold and to verify whether the matched records were for the same individuals. The cutoff threshold differed across our probability matching specification due to the availability of information across data set. For instance, when only year of birth (along with names) was available in both data set; a higher probability threshold value of 0.90 was utilized after manual examination of matched records. However, when date of birth (month and day) was also available across dataset a lower probability threshold was found to link records accurately across datasets.

inmate is transferred for a longer stay in prison. Information was collected to determine if an individual was transferred to another incarceration system and observations were removed if individuals were transferred to another incarceration system.

4.1. *Definition of methadone initiation and continuation*

Using treatment data obtained from RSONM two treatment groups were constructed, a MMT continuation group and a MMT initiation group. MMT continuation refers to individuals that were receiving MMT in the community before entry in the jail and MMT initiation refers to individuals that were not. In the RSONM dataset there are also treatment episodes that were defined as “courtesy dose” which refers to short-term treatment episodes for individuals who were receiving community-based treatment before entry into the jail. RSONM has an exception from the state to continue to dispense prescriptions to patients at the dose prescribed from the home (community-based) clinic for up to a month.¹⁴ These patients are not formally enrolled in the program unless they stay in the MDC for over a month.¹⁵ In our analysis, these individuals were assigned to the MMT continuation group.

4.2. *Cleaning and merging datasets*

Data were collected for individuals that had an incarceration event between February 1st, 2019 and April 30th, 2020. During this time, a total of 1,320 individuals were recorded to have had an interaction with MDC MMT program. Also, during this time the health-screener dataset

¹⁴ The standard exemption rate is 2 weeks.

¹⁵ It is not uncommon for an individual to be enrolled in the program after receiving courtesy doses for the first 30 days of incarceration.

recorded a total of 19,005 individuals that were screened upon entry at the MDC, and of these 4,096 (21.5%) self-reported prior opioid use.

Datasets were merged and cleaned. For our treatment groups, individuals where dosage information was not available were removed (n = 115), and in cases where the health screener records could not be matched were removed (n = 64). Individuals were removed from the dataset in cases where booking information could not be matched (n = 25). Observations were removed if an individual's recorded treatment start date differed by more than 5 days across RSONM data sets (n = 38). Also, individuals whose reported treatment started after the release from MDC (n = 85), and observations were removed if a recorded treatment ended more than 20 days after the release (n = 12) were removed.

Our comparison group was constructed from individuals that (1) were in jail during the study period, (2) completed the health screener, (3) self-reported prior opioid use, and (4) did not receive MMT treatment within the jail. From the original 4,096 individuals that self-reported prior opioid use on the health screener 1,293 received MMT at the MDC and thus were removed from our comparison group.¹⁶ Probability matching was used to link comparison group members with booking records.¹⁷ Comparison group observations that did not match with booking information were removed (n = 79).

Another important consideration when using jail data is the possibility that an individual is sentenced and transferred to prison (which is typically a minimum of 365 days). Individuals

¹⁶ The individuals with self-reported opioid use were sequentially linked with two sets of data from RSNOM (list of participants data and a separate dosage data) using probability matching method that utilized name and year of birth information. In the process, 1293 individuals (out of 4096) were identified to have possibly received treatment in MDC. Given comparison is should only consists of individuals without treatment, individuals who could have probable records of receiving MMT in MDC were removed.

¹⁷ For the linking process, probability matching method was utilized. Only name information was utilized to link with MDC data, and name and year of birth utilized to link to RSNOM data. Probability matching utilizes name and date of birth information. Linked records were visually examined to define a weight threshold

were removed from the sample if they were transferred to New Mexico Correctional Department (or other agency) during the indexed booking. This resulted in the removal of 162 individuals from the treatment groups, and 656 individuals from the comparison group.

Overall, after matching, cleaning, and merging across different datasets, our sample contained 2,887 observations – 428 individuals that received MMT initiation, 391 individuals that received MMT continuation, and 2,068 individuals in our comparison group.

4.3. Balancing the sample

An unanticipated aspect of our study design was a large difference in length of stay for the indexed crime event between the initiation, continuation, and comparison groups. Figure 1 presents percent distributions for the length of stay for the MMT initiation, MMT continuation, and comparison groups. Comparably, the initiation group had a much longer length of stay. The initiation group had an average length of stay of 161 days, the continuation group had an average length of stay of 45 days and the comparison group had an average length of stay of 17 days. These differences were driven in large part by individuals that had either very short or very long stays in prison. Notably, 78 percent of the comparison group spent 9 or less days in jail for the indexed crime event. Also, 41 percent of the initiation group spent more than 150 days in jail for the indexed crime event.

To address the imbalance in our sample, we restricted the sample to individuals that were in jail 10 or more days and less than 365 days.¹⁸ After restricting the data, a total of 393 individuals remained in the MMT initiation group, 194 in the MMT continuation sample, and 444 individuals in the comparison group (sample with self-reported opioid use that did not

¹⁸ Models are also estimated not using this restriction, which provide generally similar results.

receive treatment).¹⁹ Once the sample was restricted, the length of stay distributions were more similar between groups. However, length of stay distributions still exhibited differences between groups, which is a limitation of our study.^{20,21} To further address this data limitation we also apply propensity score matching and entropy balancing methods as robustness checks.

5. Empirical methods

To evaluate the impact of MMT initiation and continuation on recidivism a difference-in-difference (DD) method was used. This model evaluates the effect of treatment using the average change in the incarceration days before and after intervention across treatment and comparison groups (Angrist & Pischke, 2008; Huntington-Klein, 2021).²² The DD method is a very common quasi-experimental design used to evaluate the causal effect of a specific program or policy intervention because it allows researchers to account for pre-existing differences before the intervention, thus mitigating issues of sample selection.

Our main results are obtained by applying the DD model to the restricted sample. We also implemented several additional models to evaluate the robustness of our results. First, the estimated model used the full (unrestricted) sample. Next, we used several empirical techniques (nearest neighbor propensity score matching, and entropy balancing methods) to mitigate sample selection. Nearest neighbor propensity score matching was conducted using information on age,

¹⁹ Appendix figure 1 presents distribution of length of stay for the restricted sample.

²⁰ Approximately 26.8 percent in continuation and 32.7 percent in comparison group spent between 10-19 days in jail. Also, at the higher end of the distribution, 10.3 percent of continuation group and 9.5 of comparison spent more than 150 days in the jail.

²¹ Only 2.8 percent in initiation group between 10-19 days in jail compared to 32.7 percent in comparison group. Also, 36.6 percent in initiation group spent more than 150 days in the jail compared to 9.5 percent in comparison group.

²² The difference in outcome is first evaluated across period for each group to capture the *within* group variation. The *within* group variation is then compared across treatment and comparison group to evaluate treatment effect. In other words, the DD methods examines the net change in outcome between treatment and comparison group when going from before to after intervention.

gender, reported history of substance use (methamphetamine use, cocaine, hallucinogen, prescription stimulants, and sedatives/sleeping pills),²³ and prior treatment of methadone or suboxone. In addition, we used prior criminal justice history (criminal charges, number of offenses, and incarceration days) and incarceration days during the reference booking event in the matching. The entropy balancing method is an iterative process to construct weights for each observation in the comparison sample such that the mean and variance of covariates perfectly mimics the mean and variance of covariates in the treatment group (Hainmueller, 2012).²⁴

Finally, as treatment engagement after release is correlated with therapeutic effect, it is plausible that inmates with longer treatment durations at MDC are more likely continue community-based treatment after release, and thus be less likely to return to jail. Analysis was conducted to examine heterogeneous effects on post-release incarceration days between individuals who engaged in shorter (less than or equal to 70 days) and longer duration of treatment (greater than 70 days) at MDC.

6. Results

6.1. Descriptive statistics

Table 1 presents summary statistics for the restricted sample. Recall that this sample was restricted to individuals that were in jail longer than 9 days and less than one year.²⁵ The average age of the MMT initiation group was 33.4, which is similar to the comparison group (34.3). For the MMT continuation group, the average age was 36.1, which is slightly higher and

²³ Self-reported opioids use was not considered as covariates, as by design all of comparison group consist of individuals who reported opioids use. Further, none of the individuals in the methadone initiation and continuation group report inhalant use, thus self-reported inhalant use was also not considered as covariates.

²⁴ Entropy balancing method can be also extended to match skewness (3rd moment) of covariate between comparison and treatment sample.

²⁵ Summary statistics for the full sample are presented in Appendix Table 1

significantly different than the comparison group. The initiation group was 76 percent male (statistically different from comparison group), the continuation group was 73 percent male (not statistically different from comparison group), and the comparison group was 68 percent male.

In terms of substance use, 83 percent of the inmates that received MMT initiation and 81 percent of the inmates that received MMT continuation self-reported opioid use on the jail health screener. A criterion for receiving MMT initiation and continuation is prior opioid use, so the less than 100 percent self-reported opioid use suggests the jail screener did not perfectly elicit prior substance use data. This is not surprising as some inmates may be reticent to disclose illicit substance use to jail employees.²⁶ The entire comparison group reported prior opioid use. This is because self-reported opioid use was the criterion used to construct the comparison group. 61 percent of the MMT initiation group reported methamphetamine use, which is similar to the rate of the comparison group (59 percent), but significantly higher than the MMT continuation group (39 percent).

In terms of prior criminal offenses, the average offenses classified as felony 4th degree offenses (33 percent) for initiation group is higher and statistically different from 28 percent for comparison group. Similarly, other felony charges of 19 percent for initiation group are higher and significantly different than corresponding 16 percent for comparison group. Comparing continuation group to comparison group, average offenses classified as felony 2nd degree (8 percent) and parole violations (14 percent) was higher for continuation group and statistically different from corresponding felony 2nd degree (4 percent) and parole violations (10 percent) for comparison group.

²⁶ Because of underreporting of substance use on the jail screener, it is likely that we miss some individuals from our comparison group (i.e., some individuals with prior substance use will not report it on the jail screener and thus will not be included in the study). This will not cause sample selection bias unless there is some unobserved reason that inmates selectively underreport substance use and this reason is correlated with subsequent criminal activity).

The initiation group had a higher average number of prior offenses (5.84) and total length of stay (154.73) in the 3-year period before the indexed crime event than the continuation group (4.16 and 109.18) and the comparison group (3.60 and 84.37). In the robustness section, propensity score and entropy matching methods were utilized to attempt to further mitigate sample selection.

6.2. *Visual evidence*

Figure 2 presents the average total number of incarceration days over time for the MMT continuation and MMT initiation groups. Panel A presents the average number of incarceration days for the MMT initiation group and the comparison group and Panel B presents the incarceration days plotted for the continuation group (with the same comparison group).

The first thing to note from panels A and B is that both the initiation and continuation groups exhibit similar pre-indexed-incarceration trends compared with the comparison group. This is evidence that the DD estimator is appropriate for this sample. Second, in both panes the comparison group exhibits a general increase in incarceration days after the reference crime event. This is consistent with a strong body of research that shows that incarcerated individuals are likely to return to incarceration systems within one year. Third, both treatment groups, but particularly the initiation group, exhibit higher pre-indexed-crime-incarnation trends compared with the comparison group. This suggests that there may be sample selection between groups, providing additional evidence for the DD empirical design.

We next visually compare incarceration trends for the MMT initiation group with the comparison group (panel A). In the pre period incarceration trends were similar. In the three months after treatment was received average incarceration days decreased dramatically for the

MMT initiation group relative to the comparison group. After the first three months, incarceration rates rebound a bit but the difference in average incarceration days between the initiation and comparison group remained smaller than the difference observed in the pre period. Panel B compares incarceration trends for MMT continuation group with the comparison group. In this pane the MMT continuation group is observed to have higher average incarceration rates in all pre periods relative to the comparison group, and in all post periods the MMT continuation group has lower average incarceration rates relative to the comparison group. This is strong visual evidence that MMT continuation is associated with reduced incarceration.

6.3. *Difference-in-difference (DD) results*

Table 2 presents DD estimates for the impact of MMT initiation and continuation on reincarceration. The left side of Table 2 reports the average number of incarcerated days in the one-year period before and the one-year period after the indexed crime event. The right side of Table 2 presents the difference in incarceration days for the initiation and continuation groups from the comparison group. The bottom column of Table 2 presents the difference between pre- and post-outcomes, and our DD estimates (our main results) are presented in the 2 rightmost estimates in the bottom row.

First, as was observed in Figure 2, the initiation group had a significantly higher average number of incarceration days in the pre period (69.65) compared with the comparison group (32.44). While less pronounced the continuation group also had a significantly higher number of incarceration days (45.88) than the comparison group. Next, statistical tests of the impact of MMT initiation and MMT continuation on incarceration days is presented in the bottommost two right columns. The DD models estimated that MMT initiation is associated with an 18.57-day

reduction in reincarceration days and MMT continuation was associated with a 30.72-day reduction in reincarceration days. Both estimates are highly significant (at the 1-percent level).

6.4. *Robustness checks*

Numerous assumptions were made when defining our sample and when addressing potential sample selection. First, in our main results we balanced our sample by restricting the analysis to a subset of individuals who stayed in the jail between 10 days to 1 year during the reference booking event. To check the impact of this data restriction we estimate DD models with the unrestricted sample. Results are presented in Table 3, panel A. While the magnitude of the estimates changed a bit – the estimated effect for MMT initiation was slightly larger (22.20 days) and the estimated effect of MMT continuation was lower (17.35 days), but both MMT initiation and MMT continuation were still found to be significantly associated with reductions in incarceration days.

Another limitation of our study is the dissimilarities in prior crime history (number of offenses, and incarceration days) across the MMT treatment groups and comparison group. To address this limitation, we implemented additional models that used propensity score matching and entropy balancing. In panel B and C, nearest neighbor propensity score matching was applied.²⁷ In panel B, MMT initiation group was compared to the propensity score matched comparison sample using the DD method. In these models a significant negative effect of MMT initiation was again found (13.93 days). However, in Panel C MMT continuation was not

²⁷ Propensity score matching method are implemented separately for each treatment groups (MMT initiation and MMT continuation). Thus, the findings are reported in two separate panels.

associated with reductions in incarceration days (point estimates is 7.59 days) at conventional levels.²⁸

Finally, in panel D and E, the entropy balancing method was implemented to generate weights for observations in the comparison sample.²⁹ Utilizing the DD method on weighted comparison group MMT initiation was found to be associated with significant reductions in incarceration days (12.66 days). MMT continuation was found to be associated with significant reductions in incarceration days (6.50 days), but this estimate was smaller than our main DD estimates.³⁰

6.5. *Heterogeneity examination*

As treatment retention is correlated with therapeutic effects, it is plausible that inmates who engage in MMT for a longer period of time at MDC will be more likely to continue community-based treatment post release and thus may be less likely to return to jail. To examine presence of heterogeneous effect based on treatment duration, Figure 3 presents graphical trends in incarceration days for subsamples of our treatment groups based on treatment duration and length of stay. Specifically, we break the treatment sample into individuals that received 70 days or more of treatment and individuals that received less than 70 days of treatment.

It is important to note that individuals who were treated for longer periods of time within the jail, by necessity, have longer lengths of stay in jail, which could have a confounding effect.

²⁸ Appendix Figure 2, panel A and B, presents standardized mean difference of covariates for unmatched and matched comparison sample.

²⁹ Similar to propensity score matching method, entropy balancing is conducted separately for each treatment group. Appendix table 2a and 2b presents the mean and variance of covariates in the comparison sample before balancing and after balancing.

³⁰ In appendix table 3, panel A, we perform additional robustness check based on definition of MMT initiation group. Specifically, we divide initiation group into two categories based on inmates with and without history of prior treatment engagement. Statistically significant decrease in post incarceration days is only observed when initiation groups is solely comprised of inmates with prior treatment engagement.

Thus, we chose to compare individuals that received 70 days or more days of treatment with a subset of the comparison sample that were incarcerated for 70 days or more. Also, we compare individuals that received less than 70 days of treatment with a subset of the comparison sample that were incarcerated for less than 70 days. Panels A and C present the average number of incarceration days both before and after treatment for individuals who participated in MMT initiation (and continuation) for less than or equal to 70 days. Panels B and D present the average number of incarceration days for individuals who participated in MMT initiation (and continuation) for more than 70 days

Results from Figure 3 suggests interesting heterogeneous treatment effects. First, in all panes the treatment and comparison samples visually exhibit mostly parallel trends, which suggests that the DD model is appropriate. Next, a larger treatment effect was observed for the subsamples of inmates that received a longer period of MMT treatment. In Panel A and C only a small treatment effect was observed for inmates that received MMT initiation and continuation for less than or equal to 70 days. Conversely, in Panel B and D a large treatment effect was observed for individuals that received MMT initiation and continuation for 70 days or more of treatment.

To empirically test for heterogeneous treatment effects, Table 4 presents the results of DD models estimated with samples conditioned by amount of treatment and length of time in jail. In Panel A MMT initiation that was provided for less than 70 days is not significantly associated with reductions in reincarceration (point estimate is 9.22 fewer days) and MMT continuation that is provided for less than 70 days is found to be significantly associated with a reduction in recidivism days, but this effect is smaller than in Table 2 (20.48 fewer days). In Panel B MMT initiation and continuation that is provided for 70 days or more, was found to be

associated with greater reductions in recidivism days. MMT initiation that is provided for 70 days or more, was found to be associated with a 22.08 reduction in recidivism days and MMT continuation that was provided for more than 70 days, was found to be associated with a 60.01 reduction in recidivism days. Both effects were statistically significant at conventional significance levels (Initiation was significant at the 10% level and continuation was significant at the 1% level).

7. Discussion and conclusion

Given the strong correlation between SUD and crime, there are potentially substantial benefits associated with jail-based MMT on crime and recidivism. Unfortunately, much of the academic work studying incarceration-based MOUD in other states has not found significant reductions in crime and recidivism (Farabee et al., 2020; Gordon et al., 2017; Lee et al., 2018; Moore et al., 2019). This differs from prior work in New Mexico that found considerable reductions in crime outcomes due to MMT continuation (Horn et al., 2020; Westerberg et al., 2016).

Historically, a criterion required to enroll in the MDC MMT program was that individuals had to be enrolled in a community-based treatment. However, in 2017 the MMT program at the MDC was expanded and began allowing treatment to individuals who had not been receiving methadone in the community prior to incarceration. This is potentially highly valuable in identifying individuals who were not currently receiving treatment and engagement in MMT. Also, entry into the incarceration system is a time when an individual is possibly more receptive to treatment. In this study we evaluate the impact of this expansion to the MDC MMT program to better understand the effectiveness of this program. This study is important to New

Mexico, policy makers in other states, and the larger field studying substance use disorders (SUD), to better understand the societal impacts of jail-based MMT initiation.

To study the impact of the MDC MMT initiation program a quasi-experimental design was used that leveraged MDC health-screener data to construct a comparison group out of individuals that self-reported opioid use but did not participate in the MDC MMT program. Data was collected from a variety of data sources, linked, and thoroughly cleaned. A difference-in-difference (DD) empirical method was used that mitigates potential sample selection. Using this analysis evidence is found that jail-based MMT initiation significantly reduced reincarceration. Our primary analysis suggests that MMT initiation is associated with an average reduction in approximately 19 incarceration days in the one-year period after jail-based MMT was received. We were also able to confirm earlier results that providing jail-based MMT continuation also reduces recidivism. We find that jail-based MMT continuation is associated with a reduction of approximately 31 incarceration days in the one-year period post release.

Our results were robust to a number of robustness checks. First, pre-post incarceration rates were checked to evaluate if the DD model is appropriate, which was confirmed. Our results were robust to alternate specifications where data restrictions were relaxed. Also, our findings were generally robust when sample selection issues were addressed using propensity score matching and entropy balancing method.³¹ In addition, an interesting heterogenous treatment effect was found. Individuals that received jail-based MMT for longer periods of time had larger reductions in reincarceration. Estimates suggest that individuals who received MMT initiation for 70 days or more were associated with approximately 22 fewer reincarceration days and

³¹ The propensity score matching method finds that participants at MMT initiation exhibited reduction of approximately 14 days, but no significant effect from MMT continuation. Further, when entropy balanced method is applied, we observe statistically significant reduction of 13 days associated with MMT initiation, and 6 days associated with MMT continuation.

individuals that received MMT continuation were associated with approximately 60 fewer reincarceration days.

In sum, this report provides robust evidence that the MDC MMT program reduces recidivism overall, and the new MDC MMT initiation program is also associated with significant reductions in reincarceration.

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Table 1: Summary Statistics for Restricted Sample

	Initiation		Continuation		Comparison	
	N = 393		N = 194		N = 444	
	Mean	SD	Mean	SD	Mean	SD
Age	33.37	7.87	36.09	9.95	34.31	9.86
Male (1 = Yes)	0.76	0.43	0.73	0.44	0.68	0.47
Ever reported Substance Use (1= Yes)						
<i>Opioids (Prescription or Street)</i>	0.83	0.38	0.81	0.39	1.00	0.00
<i>Methamphetamine</i>	0.61	0.49	0.39	0.49	0.59	0.49
<i>Cocaine</i>	0.08	0.28	0.04	0.19	0.07	0.25
<i>Hallucinogens</i>	0.01	0.07	0.01	0.07	0.02	0.13
<i>Prescription stimulants</i>	0.03	0.17	0.03	0.16	0.01	0.08
<i>Sedatives or sleeping pills</i>	0.17	0.38	0.11	0.31	0.12	0.32
<i>Inhalants</i>	0.00	0.00	0.00	0.00	0.00	0.05
Ever reported Methadone or Suboxone Use (1 = Yes)						
<i>Methadone</i>	0.26	0.44	0.81	0.39	0.08	0.27
<i>Suboxone</i>	0.10	0.31	0.02	0.14	0.07	0.26
Treatment Received during Reference Period						
<i>Avg. Dosage of Methadone (mg)</i>	46.48	24.71	83.31	31.69		
<i>Total Days of Treatment</i>	70.31	63.18	54.52	55.42		
Criminal Records						
Prior 3 years – Crime Classification						
<i>Avg. Felony 1 Degree</i>	0.00	0.04	0.00	0.03	0.00	0.03
<i>Avg. Felony 2 Degree</i>	0.06	0.15	0.08	0.20	0.04	0.14
<i>Avg. Felony 3 Degree</i>	0.06	0.14	0.05	0.15	0.04	0.13
<i>Avg. Felony 4 Degree</i>	0.33	0.25	0.28	0.27	0.28	0.29
<i>Avg. Felony Other</i>	0.19	0.20	0.17	0.20	0.16	0.22
<i>Avg. Parole Violations</i>	0.10	0.18	0.14	0.25	0.10	0.21
<i>Avg. Misdemeanor</i>	0.23	0.25	0.21	0.28	0.25	0.32
<i>Avg. Other</i>	0.01	0.07	0.01	0.04	0.01	0.06
Prior 3 years						
<i>No. of Offenses</i>	5.84	3.55	4.16	2.95	3.65	2.61
<i>Total Length of Stay</i>	154.73	156.63	109.18	155.77	84.57	117.32
Prior 1 year						
<i>No. of Offenses</i>	2.37	1.76	1.49	1.36	1.31	1.38
<i>Total Length of Stay</i>	69.65	76.12	45.88	73.13	32.44	56.87
During						
<i>Total Length of Stay</i>	132.64	88.89	61.40	70.28	55.29	64.65

Table 2: Average Incarceration days conditioned on Treatment Groups for Restricted Sample

	Treatment Types			Difference	
	MMT Initiation	MMT Continuation	Comparison	Initiation vs. Comparison	Continuation vs. Comparison
N	393	194	444		
Pre-Treatment incarceration days	69.65	45.88	32.44	37.21***	13.44**
Post-Treatment incarceration days	72.18	36.32	53.60	18.57***	-17.28***
Pre-Post difference	2.53	-9.55	21.16***	-18.64***	-30.72***

Note: Statistical difference evaluated using nonparametric bootstrap method with 500 replications. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: *Auxiliary Analysis* using Average Incarceration Days conditioned on Treatment Groups

	Treatment Types			Difference	
	MMT Initiation	MMT Continuation	Comparison	MMT Initiation vs. Comparison	MMT Continuation vs. Comparison
Panel A: Unrestricted Sample	<i>N</i> =428	<i>N</i> =391	<i>N</i> =2068		
Pre-Treatment incarceration days	70.51	30.55	12.72	57.80***	17.83***
Post-Treatment incarceration days	67.93	32.91	32.43	35.50***	0.48
Pre-Post difference	-2.59	2.36	19.71***	-22.30***	-17.35***
Panel B: Initiation - Propensity Score Matched ^a	<i>N</i> =428		<i>N</i> =428		
Pre-Treatment incarceration days	70.51		43.33	26.90***	
Post-Treatment incarceration days	67.93		53.39	12.98**	
Pre-Post difference	-2.59		10.06	-13.93**	
Panel C: Continuation - Propensity Score Matched ^a		<i>N</i> =391	<i>N</i> =391		
Pre-Treatment incarceration days		30.55	25.53		5.02
Post-Treatment incarceration days		32.91	35.48		-2.57
Pre-Post difference		2.36	9.95		-7.59
Panel D: Initiation - Entropy Balanced ^b	<i>N</i> = 428		<i>N</i> =2068		
Pre-Treatment incarceration days	70.51		67.55	2.95	
Post-Treatment incarceration days	67.93		77.63	-9.70**	
Pre-Post difference	-2.59		10.07	-12.66**	
Panel E: Continuation - Entropy Balanced ^c		<i>N</i> =391	<i>N</i> =2068		
Pre-Treatment incarceration days		30.55	18.37		12.17***
Post-Treatment incarceration days		32.91	27.24		5.67**
Pre-Post difference		2.36	8.86		-6.50**

Note: Statistical difference evaluated using nonparametric bootstrap method with 500 replications for Panel A and t-test used in Panel B-D.

^a Nearest Neighbor Propensity Score Matching method with no replacement used to identify comparison sample. ^b Entropy balancing method with 1st and 2nd moment adjusted for covariates. i.e., weights generated for comparison group such that mean, and variance of weighted covariates perfectly mimics the distribution of treatment group. ^c Entropy balancing method with 1st moment adjusted for covariates. i.e., weights generated for comparison group such that mean of weighted covariates perfectly mimics the distribution of treatment group. * *p* < 0.10, ** *p* < 0.05, *** *p* < 0.01

Table 4: Heterogeneity Test based on Duration of Treatment

	Treatment Types			Difference	
	MMT Initiation	MMT Continuation	Comparison ^a	Initiation vs. Comparison	Continuation vs. Comparison
Panel A:					
Reference Period Treatment Days < 70 days	N = 237	N = 146	N = 342		
Pre-Treatment incarceration days	59.89	31.55	26.96	32.93***	4.59
Post-Treatment incarceration days	77.76	38.16	54.05	23.71***	-15.89**
Pre-Post	17.87***	6.61	27.09***	-9.22	-20.48***
Panel B:					
Reference Period Treatment Days >= 70 Days	N = 156	N = 48	N = 102		
Pre-Treatment incarceration days	84.47	89.46	50.80	33.67***	38.65***
Post-Treatment incarceration days	63.70	30.75	52.11	11.59	-21.35
Pre-Post	-20.78**	-58.71***	1.30	-22.08*	-60.01***

Note: Statistical difference evaluated using nonparametric bootstrap method with 500 replications. * p < 0.10, ** p < 0.05, *** p < 0.01

^a Comparison group restricted using the stated threshold on LOS during the reference booking period. *Example:* In Panel A, comparison group is restricted to LOS during reference period less than 70 days.

Figure 1: Total Length of Stay (LOS) during the Indexed Event – Unrestricted sample

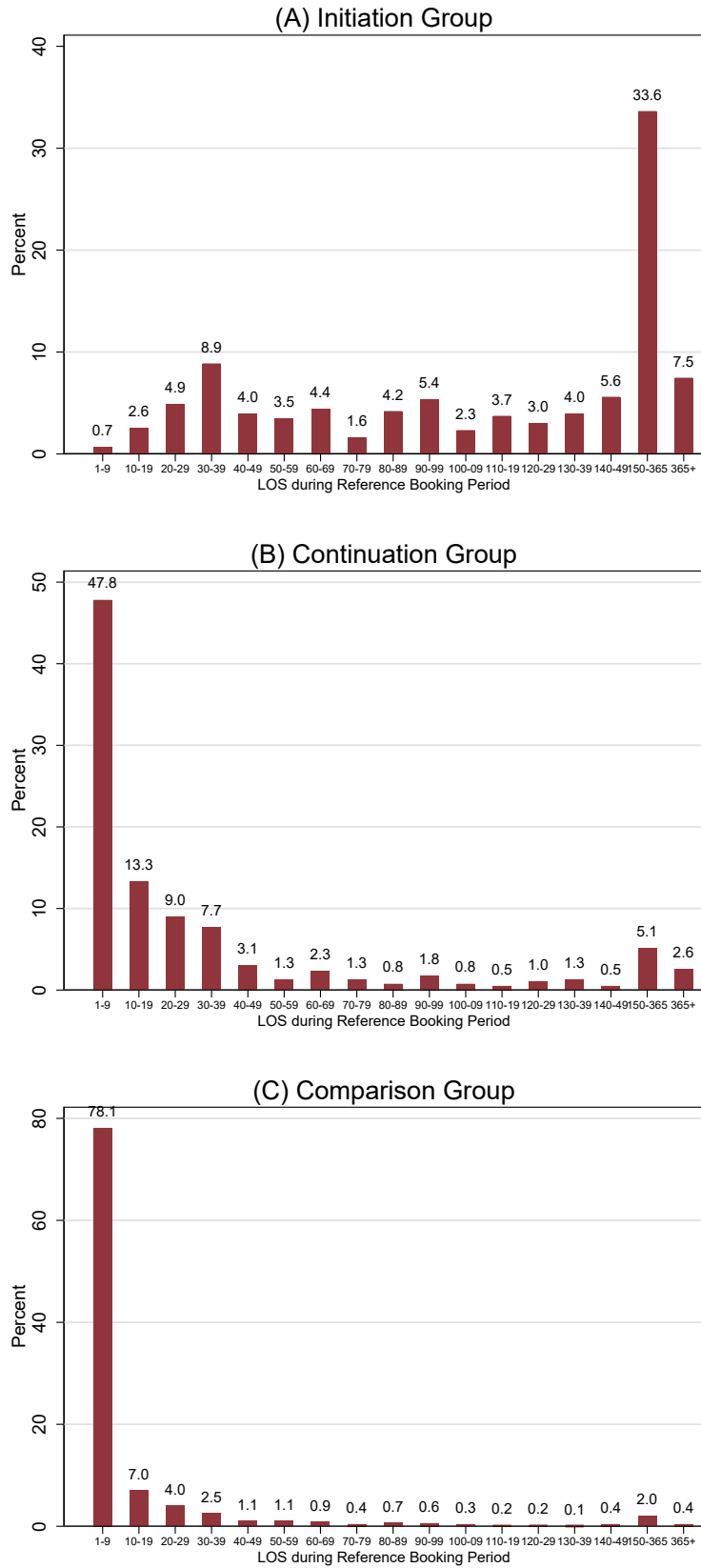


Figure 2: Pre-Post Trend in Total Length of Stay – Restricted Sample

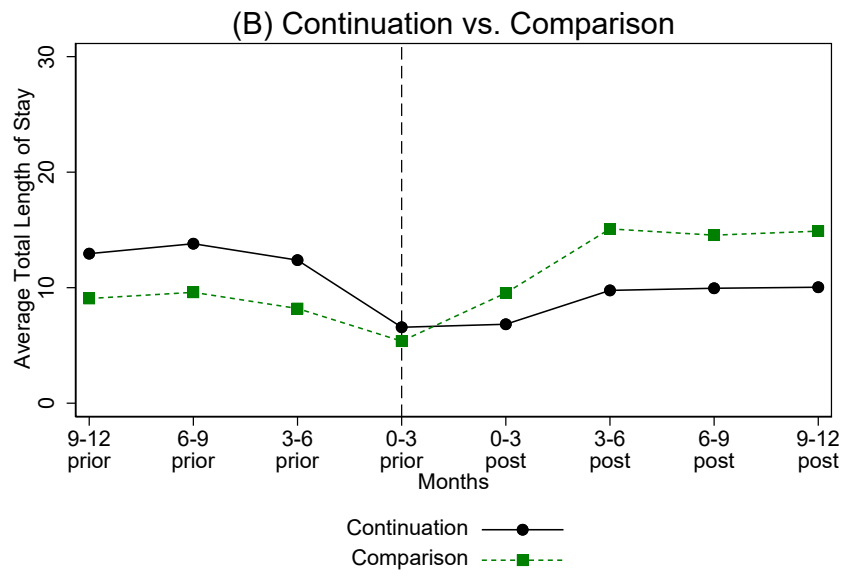
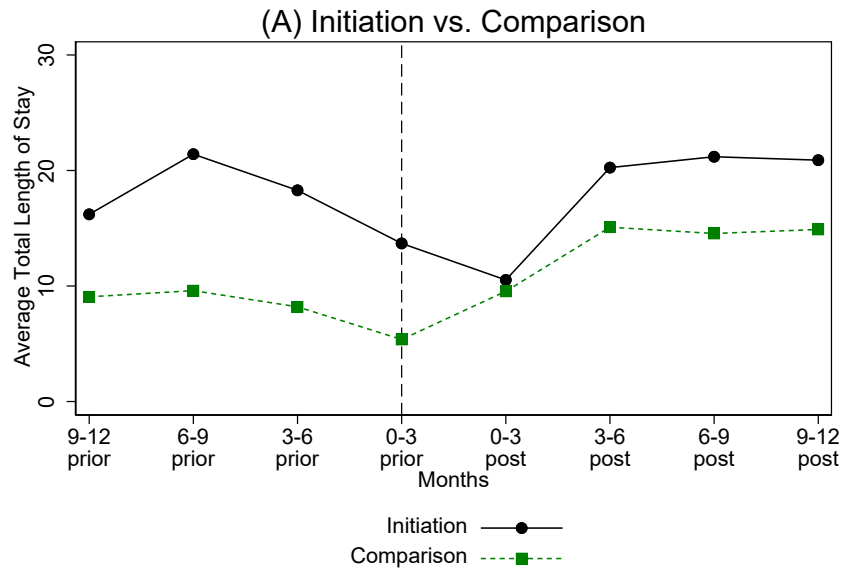
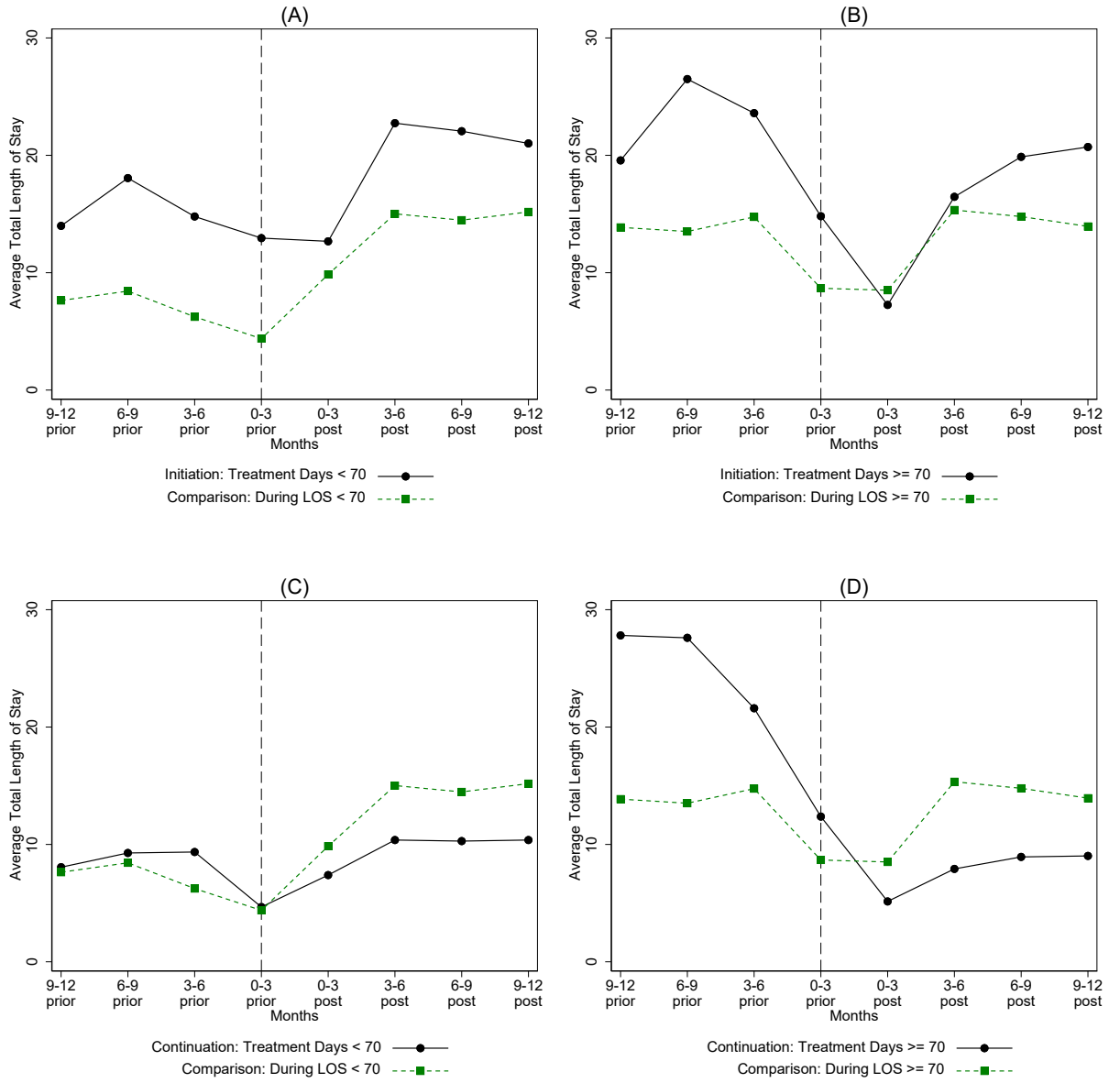


Figure 3: Pre-Post Trend by *Treatment Days* during indexed event



Appendix Table 1: Summary Statistics for Unrestricted Sample

	Initiation		Continuation		Comparison	
	N = 428		N = 391		N = 2068	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Age	33.39	7.82	35.71	9.57	34.86	9.96
Male (1 = Yes)	0.76	0.43	0.73	0.45	0.65	0.48
Ever reported Substance Use (1= Yes)						
<i>Opioids (Prescription or Street)</i>	0.82	0.38	0.87	0.34	1.00	0.00
<i>Methamphetamine</i>	0.60	0.49	0.39	0.49	0.53	0.50
<i>Cocaine</i>	0.08	0.27	0.04	0.20	0.08	0.27
<i>Hallucinogens</i>	0.01	0.10	0.00	0.05	0.01	0.12
<i>Prescription stimulants</i>	0.03	0.17	0.02	0.13	0.01	0.11
<i>Sedatives or sleeping pills</i>	0.17	0.38	0.11	0.32	0.12	0.32
<i>Inhalants</i>	0.00	0.00	0.00	0.00	0.00	0.05
Ever reported Methadone or Suboxone Use (1 = Yes)						
<i>Methadone</i>	0.25	0.43	0.82	0.39	0.10	0.30
<i>Suboxone</i>	0.10	0.30	0.02	0.13	0.07	0.25
Treatment Received during Reference Period						
<i>Avg. Dosage of Methadone (mg)</i>	47.50	24.96	63.68	38.71		
<i>Total Days of Treatment</i>	76.08	69.36	30.63	47.02		
Criminal Record						
Prior 3 years - Crime Classification						
<i>Avg. Felony 1 Degree</i>	0.01	0.04	0.01	0.06	0.00	0.02
<i>Avg. Felony 2 Degree</i>	0.06	0.15	0.06	0.18	0.02	0.11
<i>Avg. Felony 3 Degree</i>	0.06	0.14	0.05	0.14	0.03	0.11
<i>Avg. Felony 4 Degree</i>	0.33	0.25	0.25	0.29	0.17	0.29
<i>Avg. Felony Other</i>	0.19	0.20	0.12	0.18	0.07	0.18
<i>Avg. Parole Violations</i>	0.11	0.19	0.10	0.24	0.08	0.23
<i>Avg. Misdemeanor</i>	0.22	0.24	0.26	0.34	0.29	0.39
<i>Avg. Other</i>	0.02	0.10	0.01	0.06	0.01	0.07
Prior 3 years						
<i>No. of Offenses</i>	5.83	3.55	3.38	2.95	2.25	2.49
<i>Total Length of Stay</i>	160.22	163.16	82.74	141.09	45.02	94.85
Prior 1 year						
<i>No. of Offenses</i>	2.35	1.74	1.20	1.36	0.63	1.07
<i>Total Length of Stay</i>	70.51	76.95	30.55	61.99	12.72	38.78
During (Reference Period)						
<i>Total Length of Stay</i>	161.30	141.50	45.43	95.91	16.75	57.22

Appendix Table 2a: Statistics for MMT Initiation vs. Comparison Sample - Entropy Balancing

	Initiation		Comparison			
	N = 428		N = 2068			
	Mean	Variance	<i>Before Balancing</i>		<i>After Balancing</i>	
Mean			Variance	Mean	Variance	
Male (1 = Yes)	0.76	0.18	0.64	0.23	0.76	0.18
Age	33.39	61.22	34.93	99.71	33.39	61.21
Ever reported Substance Use (1= Yes)						
<i>Methamphetamine</i>	0.60	0.24	0.53	0.25	0.60	0.24
<i>Cocaine</i>	0.08	0.07	0.08	0.07	0.08	0.07
<i>Hallucinogens</i>	0.01	0.01	0.01	0.01	0.01	0.01
<i>Prescription stimulants</i>	0.03	0.03	0.01	0.01	0.03	0.03
<i>Sedatives or sleeping pills</i>	0.17	0.14	0.11	0.10	0.17	0.14
Ever reported Methadone or Suboxone Use (1 = Yes)						
<i>Methadone</i>	0.25	0.19	0.10	0.09	0.25	0.19
<i>Suboxone</i>	0.10	0.09	0.07	0.06	0.10	0.09
Prior 3 years – Crime Classification						
<i>Avg. Felony 1 Degree</i>	0.01	0.00	0.00	0.00	0.01	0.00
<i>Avg. Felony 2 Degree</i>	0.06	0.02	0.02	0.01	0.06	0.02
<i>Avg. Felony 3 Degree</i>	0.06	0.02	0.03	0.01	0.06	0.02
<i>Avg. Felony 4 Degree</i>	0.33	0.06	0.17	0.08	0.33	0.06
<i>Avg. Felony Other</i>	0.19	0.04	0.07	0.03	0.19	0.04
<i>Avg. Parole Violations</i>	0.11	0.04	0.08	0.05	0.11	0.04
<i>Avg. Misdemeanor</i>	0.22	0.06	0.29	0.15	0.22	0.06
<i>Avg. Other</i>	0.02	0.01	0.01	0.00	0.02	0.01
Prior 3 years						
<i>No. of Offenses</i>	5.83	12.62	2.20	6.03	5.83	12.62
<i>Total Length of Stay</i>	160.20	26621.00	43.90	8948.00	160.10	26612.00
During						
<i>Total Length of Stay</i>	161.2	20021.00	16.75	3275.00	161.2	20021.00

Appendix Table 2b: Statistics for MMT Continuation vs. Comparison Sample - Entropy Balancing

	Continuation		Comparison			
	N = 391		N = 2068			
	Mean	Variance	<i>Before Balancing</i>		<i>After Balancing</i>	
Mean			Variance	Mean	Variance	
Male (1 = Yes)	0.73	0.20	0.64	0.23	0.73	0.20
Age	35.71	91.62	34.93	99.71	35.71	105.80
Ever reported Substance Use (1= Yes)						
<i>Methamphetamine</i>	0.39	0.24	0.53	0.25	0.39	0.24
<i>Cocaine</i>	0.04	0.04	0.08	0.07	0.04	0.04
<i>Hallucinogens</i>	0.00	0.00	0.01	0.01	0.00	0.00
<i>Prescription stimulants</i>	0.02	0.02	0.01	0.01	0.02	0.02
<i>Sedatives or sleeping pills</i>	0.11	0.10	0.11	0.10	0.11	0.10
Ever reported Methadone or Suboxone Use (1 = Yes)						
<i>Methadone</i>	0.82	0.15	0.10	0.09	0.82	0.15
<i>Suboxone</i>	0.02	0.02	0.07	0.06	0.02	0.02
Prior 3 years – Crime Classification						
<i>Avg. Felony 1 Degree</i>	0.01	0.00	0.00	0.00	0.01	0.00
<i>Avg. Felony 2 Degree</i>	0.06	0.03	0.02	0.01	0.06	0.03
<i>Avg. Felony 3 Degree</i>	0.05	0.02	0.03	0.01	0.05	0.02
<i>Avg. Felony 4 Degree</i>	0.25	0.09	0.17	0.08	0.25	0.09
<i>Avg. Felony Other</i>	0.12	0.03	0.07	0.03	0.12	0.05
<i>Avg. Parole Violations</i>	0.10	0.06	0.08	0.05	0.10	0.06
<i>Avg. Misdemeanor</i>	0.26	0.11	0.29	0.15	0.26	0.10
<i>Avg. Other</i>	0.01	0.00	0.01	0.00	0.01	0.00
Prior 3 years						
<i>No. of Offenses</i>	3.38	8.72	2.20	6.03	3.38	6.84
<i>Total Length of Stay</i>	82.74	19907.00	43.90	8948.00	82.75	17175.00
During						
<i>Total Length of Stay</i>	45.43	9199.00	16.75	3275.00	45.43	22381.00

Appendix table 3: Auxiliary analysis for MMT Initiation Sample based on Duration of Treatment

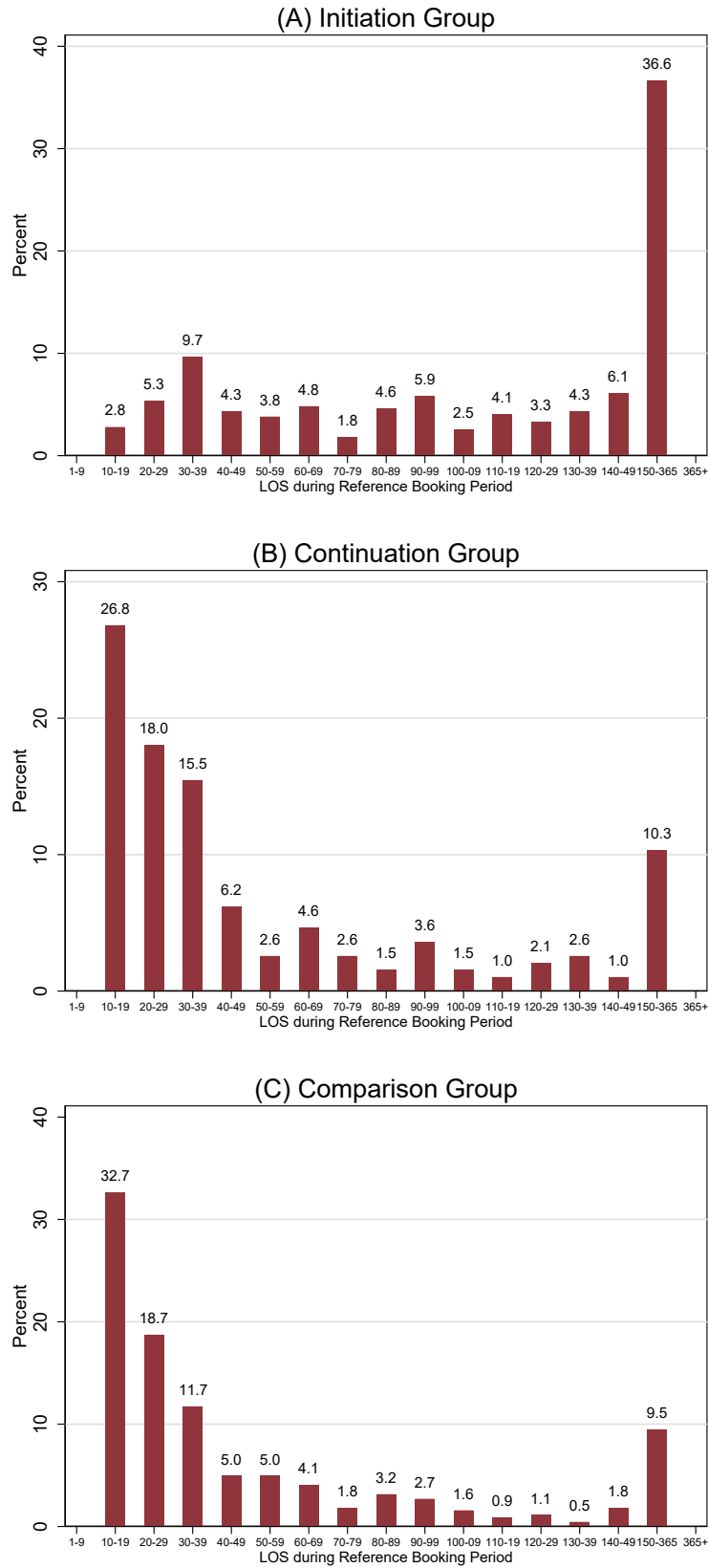
	Treatment Types			Difference	
	Initiation		Comparison	(A) vs. Comparison	(B) vs. Comparison
	Group A	Group B			
Panel A: Definition of Initiation Group ^a	(N = 235)	(N = 158)	(N = 444)		
Pre-Treatment incarceration days	48.03	101.80	32.44	15.59***	69.36***
Post-Treatment incarceration days	72.33	71.96	53.60	18.73***	18.35**
Pre-Post	24.30	-31.59	21.16	3.13	-51.01***
Panel B: Reference Period Treatment Days ^b	(N = 237)	(N = 156)	(N = 444)		
Pre-Treatment incarceration days	59.89	84.47	32.44	27.46***	52.04***
Post-Treatment incarceration days	77.76	60.70	53.60	24.16***	10.10
Pre-Post	17.87	-20.78	21.16	-3.30	-41.94***

Note: Statistical difference evaluated using nonparametric bootstrap method with 500 replications. * p < 0.10, ** p < 0.05, *** p < 0.01

^a Group A comprises of inmates without prior treatment history, group B comprises of inmates with prior treatment history

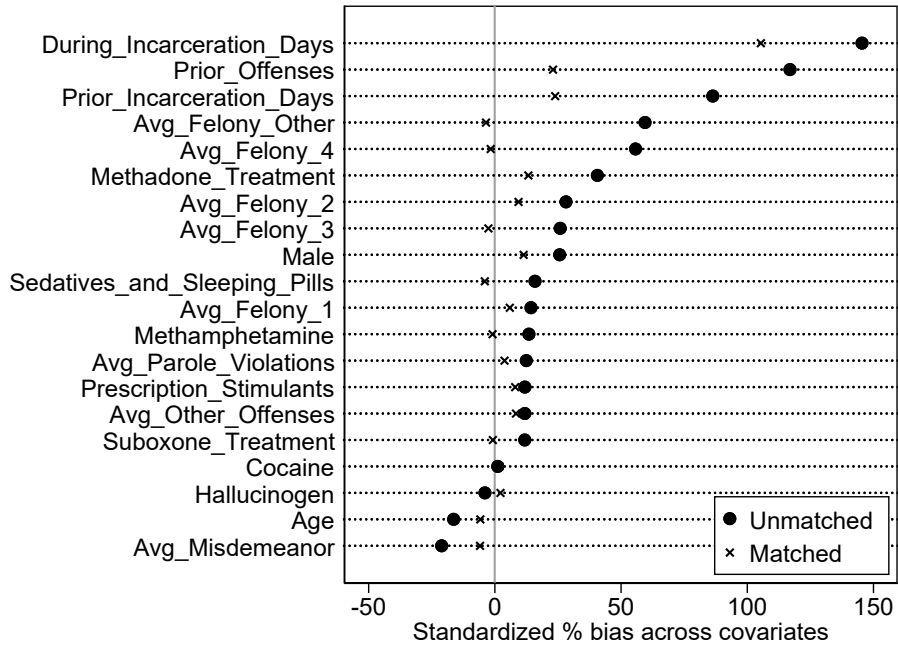
^b Group A comprises of individuals who spent 70 days or less during indexed event, group B individuals who spent more than 70 days during indexed event

Appendix Figure 1: Total Length of Stay (LOS) during the Indexed Event – Restricted sample

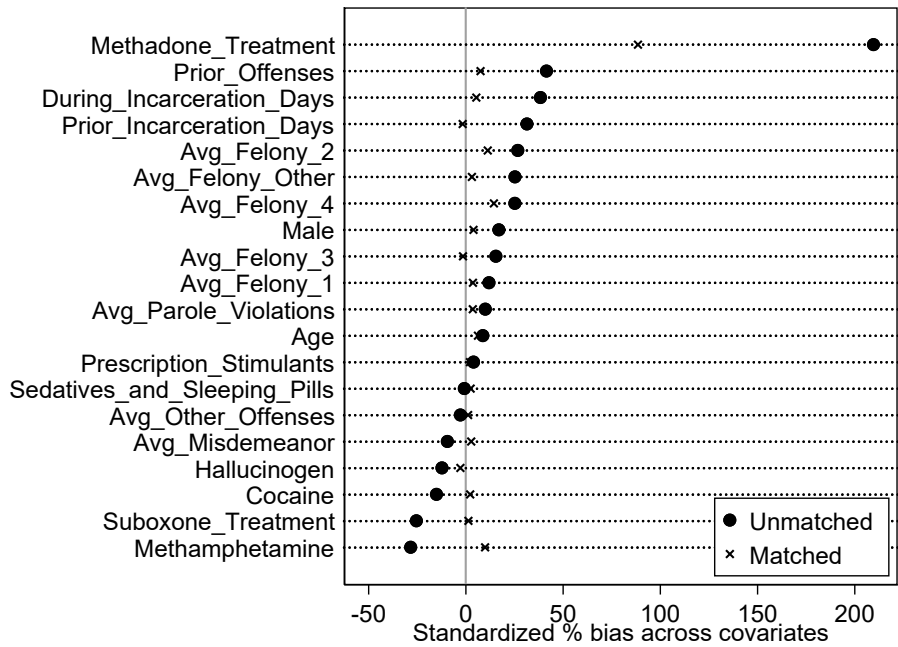


Appendix Figure 2: Standardized Mean Difference – Propensity Score Matching

(A) Initiation vs. Comparison



(B) Continuation vs. Comparison



Appendix Figure 3: Pre-Post Trend by *Incarceration days* during indexed event for each group

