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Motivational Interviewing Case Management (MICM) for Persons on Probation or Parole Entering Sober Living Houses

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Abstract

The failure of incarceration as a response to drug offenses has resulted in new policies supporting community-based alternatives. One challenge has been finding appropriate housing for persons on probation and parole. Sober living houses (SLHs) are alcohol- and drug-free living environments that are increasingly being used as housing options for these individuals. The current study examined 6- and 12-month outcomes for 330 persons on probation or parole who entered 49 SLHs. Residents in 22 houses (n = 149 individuals) were randomly assigned to receive a “Motivational Interviewing Case Management” (MICM) intervention and residents in the other 27 houses (n = 181 individuals) received SLH residency as usual. At 6- and 12-month follow-up, both study conditions showed significant improvement relative to baseline on substance abuse, criminal justice, HIV risk, and employment outcomes. For persons who attended at least one MICM session, there were better criminal justice outcomes compared to the SLH as usual group.

Research on criminal justice populations has shown that a variety of interventions can be helpful to persons on probation or parole, including cognitive behavioral therapy, therapeutic communities, medications, and contingency management (Bahr, Masters, & Taylor, 2012). However, access to safe, affordable, and stable housing is an essential additional component for many probationers and parolees (Harding, Morenoff, & Herbert, 2013). This is especially the case while ex-offenders are attempting to adjust to living in the community over longer periods of time.

This paper suggests that sober living houses (SLHs), a type of residential recovery home for persons with alcohol and drug problems, can be a good option for many probationers and parolees with a history of substance abuse. A randomized clinic trial is described that tested whether outcomes could be improved through implementation of a new intervention for probationers and parolees in SLHs, motivational interviewing case management (MICM).

Incarceration for Drug Offenses

Since the 1970's, the predominant response to drug related problems has been punishment and incarceration (Sentencing Project, 2016). Between 1980 and 2014 there was more than a tenfold increase in the number of persons incarcerated for drug offenses in U.S. prisons and jails. By 2014, the number of persons incarcerated for drug offenses reached 488,400 persons (Sentencing Project, 2016). King, Peterson, Elderbroom, and Taxy (2015) noted that half of all persons incarcerated in federal prisons serve time for drug offenses. As a result of these and other policies emphasizing punishment rather than rehabilitation, the U.S. now leads the world in rate of incarceration of its citizens (Sentencing Project, 2016).

There is little evidence that incarceration is a deterrent to drug offenses. For example, (Bushway, 2006) noted that 68% of all persons released from state prisons are rearrested within three years. Nearly half of them (43%) are arrested within six months of their release. Herberman and Bonczar (2015) reported that 30% of persons exiting parole in 2013 were re-incarcerated. The policy of incarceration for drug offenses combined with high recidivism rate has resulted in serious problems with prison and jail overcrowding, particularly in California (Eaglin, 2015).

Andrews and Bonta (2010) and Porter (2017) noted that the plethora of unintended consequences of the U.S. "war on drugs," combined with its failure to reduce crime, has fueled a desire for criminal justice reform among multiple stakeholders, including lawmakers, criminal justice personnel, the clergy, families of offenders, and civil rights leaders. Examples of new policies aimed at reducing incarceration include expanding incarceration alternatives (e.g., diversion and probation), reducing lengths of incarceration, reclassifying drug possession as a misdemeanor offense, streamlining parole releases for persons sentenced for a first-time nonviolent offense, and eliminating mandatory minimum limits (Brennan Center for Justice, 2016; Lofstrom & Martin, 2015; King, Peterson, Elderbroom, & Taxy, 2015).

Sober Living Houses

If criminal justice systems are to be successful in establishing alternative dispositions for drug offenders in lieu of incarceration, they are going to need to address a number of issues. One of the most important is housing (Harding, Morenoff, & Herbert, 2013). Without a safe, alcohol- and drug free living environment that supports recovery, drug offenders are vulnerable to multiple problems, including drug relapse, arrests, and re-incarceration (Polcin, 2006). In addition, without the stability of a safe place to live, it can be difficult for ex-offenders to be sufficiently organized to attend appointments, engage in services, and succeed in employment.

For at least some ex-offenders, SLHs offer the type of support and stability needed (Polcin, 2006). SLHs are alcohol- and drug-free living environments for persons attempting to maintain abstinence from alcohol and drugs. A house manager oversees operation of the facility, such as monitoring compliance with house rules, upkeep of the facility, and payment of rent and bills. The house manager is usually in recovery and lives in the home with other

residents. For their work they are compensated with reduced rent, free rent or a small monthly stipend. SLHs can be operated as nonprofit or for-profit organizations and for the most part they are funded through resident fees. However, in California the criminal justice system will pay up to six months of rent for selected parolees. After the maximum time limit, these residents must meet financial obligations using their own resources, such as finding employment or receiving financial support from their families. A limited number of low cost houses are designed to accommodate persons on social security disability and general assistance. While most houses require shared bedrooms to reduce costs and decrease social isolation, houses designed to accommodate persons on limited incomes often have three or more persons per room. Some houses are affiliated with residential or outpatient treatment programs and are designed primarily to provide living arrangements for persons after they complete residential treatment or while they attend outpatient programs. Other houses are freestanding and accept referrals from a variety of sources.

SLHs are designed to use a “social model” approach to recovery that emphasizes peer support and involvement in 12-step recovery groups (Wittman & Polcin, 2014). Although the houses typically require or encourage attendance at 12-step groups, they do not provide onsite treatment or case management services. Unlike treatment programs, residents are free to stay in the houses for as long as they wish, provided they abide by basic house rules (e.g., abstinence from alcohol and drugs, payment of rent, attendance at house meetings, and participation in upkeep of the facility). For additional details about the history of sober living houses see Polcin, et al. (2017).

SLHs are becoming increasingly popular referral sources for persons leaving criminal justice institutions (Polcin, et al., 2017). Nowhere is this shift more common than in California, where state laws and voter propositions have been enacted to expand incarceration alternatives, reduce lengths of incarceration, reclassify drug possession as a misdemeanor offense, and eliminate mandatory minimum limits (Lofstrom & Martin, 2015). SLHs may be able to play an important role in providing stable, affordable housing to this growing number of ex-offenders in the community (Polcin, 2006).

Research on SLHs

Research on SLHs is limited. One study examined 245 residents in freestanding houses ($N=16$) and found significant improvement between baseline and 6-month follow-up on measures of substance use, arrests, and employment (Polcin, Korcha, Bond, & Galloway, 2010). Importantly, improvements were maintained at 12- and 18-month follow-up. Consistent with the philosophy of social model recovery, involvement in 12-step recovery groups and social networks with less alcohol and drug use predicted better outcomes. A second study of SLHs examined outcomes of houses affiliated with an outpatient treatment program ($N=55$) and found similar improvements similar factors predicting outcome. In an analysis that combined samples from the two studies, there was evidence that persons who enter a SLH improve their housing status and psychiatric symptoms over an 18-month period of time and that both of these factors are associated with better substance use outcomes (Polcin & Korcha, 2017).

To the best of our knowledge, there has only been one analysis of ex-offenders in SLHs. That study consisted of a secondary analysis of residents in freestanding houses in Northern California who were referred from the criminal justice system ($N = 71$). Findings showed they achieved significant reductions of alcohol and drug use that were similar to voluntary residents and that improvements were maintained at 18-month follow-up (Polcin, Korcha, Wittman, & Troutman, 2010). However, persons referred from the criminal justice system were less involved in 12-step groups, more likely to be arrested, and less likely to be employed. Importantly, they also had difficulty accessing needed services in the community.

There are a few studies on other types of peer-oriented residential recovery homes that have examined outcomes of criminal justice populations. For example, in a study of Oxford houses, Jason et al. (2015) reported that residents with criminal justice involvement had better outcomes with longer lengths of stay in the houses. Oxford Houses are similar to SLHs in that they offer a substance-free living environment and social support for abstinence. The main difference from SLHs is that they use a rotating leadership model that elects residents to leadership positions rather than utilizing a house manager model.

Motivational Interviewing Case Management

This study posits that outcomes for SLH residents on probation or parole can be improved through implementation of MICM, a new intervention that combines motivational interviewing and case management. The goal of MICM is to help improve resident outcomes in SLHs by addressing critically important issues relevant to success: compliance with terms of parole and probation, successful adaptation to the SLH environment, access to and utilization of needed services, and development of plans for employment or job training. The intervention was designed to use standard MI techniques (e.g., reflections, open questions, feedback, developing discrepancies, engaging ambivalence, change planning, etc.) (Miller & Rollnick, 2012) to enhance case management procedures.

While MI has a large body of evidence supporting its effectiveness with a variety of populations (Arkowitz, Miller, & Rollnick, 2015; Miller & Rollnick, 2012), there is limited data suggesting it is effective for criminal justice populations. For example, Walters et al. (2010) compared outcomes between probationers who received a motivational interviewing intervention type of supervision versus those who received standard supervision. No drug use or other outcome differences were found. In a review of MI studies using offenders samples McMurrin (2009) found wide variation in study methods and outcomes. No definitive conclusions were presented about the effectiveness of MI for offenders. A study by Anstiss, Polaschek, and Wilson (2011) reported decreased recidivism among a pilot sample of offenders receiving an MI based intervention relative to a comparison group. However, the sample size was small ($N = 58$) and study procedures did not randomize persons to study conditions.

The limited effectiveness of MI used alone as an intervention for criminal justice populations was one reason for integrating MI with case management. Another reason was that we believed it is insufficient for case management interventions to simply assess need areas and supply criminal justice involved persons with referrals. When using MICM with

ex-offenders, the therapist assesses needs and provides referrals to services. However, they also do more by using MI interventions to help clients anticipate and respond to various challenges they encounter as they transition into a new living situation, seek employment, and access needed services in the community. Standard MI interventions such as examining the “pros and cons” of making a change and developing discrepancies between one’s goal and current behaviors are ways to improve the effects of case management.

The MICM manual used for this study gives the therapist flexibility to adapt the focus of the session based on the needs of the client. For example, the therapist might help by addressing obstacles and challenges encountered as ex-offenders use services, begin employment, engage in new relationships, and attempt to adapt to the SLH drug-free living environment. When ex-offenders discontinue services to which they were referred, leave the SLH residence, or terminate employment, the therapist helps them examine options and alternatives that are available to them. In addition to examining professional services, the therapist assists clients to consider ways they might mobilize informal sources of support (e.g., social networks, self-help groups, and religious institutions). Harm reduction is also an important component of MICM and includes discussion of ways to reducing the risk of HIV infection and minimize the destructive sequelae associated with relapse. The therapist maintains an MI stance throughout all of the interactions and relies on MI-based interventions, but they are given maximum flexibility to address the most pressing issues as clinically indicated for each client. A copy of the MICM manual used in the study can be obtained by contacting the corresponding author.

Purpose

The purpose of the current study was two-fold. First, we aimed to describe a variety of outcomes among ex-offenders on probation or parole who were entering SLHs. Because criminal justice populations suffer from a variety of problems, we examined a range of outcomes. Primary outcomes included assessments of legal problems, substance abuse, and HIV risk. Secondary problems included, employment, psychiatric severity, and housing stability. We hypothesized that residents would show longitudinal improvement on outcome measures between baseline and follow-up (6 and 12 months).

A second purpose was to test the effectiveness of the newly developed MICM intervention, which was designed to improve the outcomes of ex-offenders in SLHs. We hypothesized that we would find better outcomes for persons assigned to MICM than those assigned to the comparison group. In addition to assessing overall effects for primary and secondary variables, we intended to explore whether some subgroups of residents benefited more than others from the intervention and whether there were factors that moderated outcomes.

Methods

Data Collection Sites

All SLHs participating in the study were in Los Angeles and all were members of the Sober Living Network (SLN). The network provides training, technical assistance, and advocacy. Member houses are inspected yearly and are required to meet basic standards for health,

safety and management of the facility. The exact number of houses that are part of the SLN varies because new houses are continually being opened and others closed. At the time of data collection there were approximately 500-member houses in Southern California, 300 of which were in Los Angeles County. The current study used information obtained from the SLN to target houses in low- and middle-income neighborhoods where residents paid no more than \$1,500 per month in rent.

Recruitment

As described in more detail elsewhere (Polcin, et al., 2017), recruitment of study participants followed a two-step process. First, we contacted house managers to ascertain whether their house might be interested in being part of the study. If they were, an agreement was signed outlining the responsibilities and activities of the house. For example, houses needed to agree to inform research staff when a new resident entered the house and allow staff to attend house and regional meetings to inform residents about the study and address questions. Because we were interested in studying residents who had some type of criminal justice status, we purposively selected houses with larger numbers of residents who were on probation or parole. We also aimed to recruit houses that reflected diversity on other characteristics: 1) some affiliated with a treatment program and others freestanding, 2) a mix of houses serving men and women, and 3) houses that served a mix of low- and middle-income persons who had more limited access to services than residents at higher end houses.

Once a house agreed to participate, we began recruitment of individual residents within the house. When a new resident entered one of the participating houses, they were informed about the study and given information about ways to reach the research interviewers. In addition, interviewers maintained contact with houses and were informed when new residents entered. The goal was to conduct the baseline interview within one month after the resident had entered the house. Baseline interviews were conducted in-person, typically at the SLH site. Participants were informed they would be paid \$30 for their time completing the baseline interview and \$50 for the 6- and 12-month interviews. All participants signed an informed consent document and all study procedures were approved by the Public Health Institute Institutional Review Board.

Inclusion and Exclusion Criteria

To be included in the study, residents had to have a current criminal justice status. Because HIV risk is widespread in the criminal justice system (Belenko, 2006; Leukefeld et al., 2009), the study aimed to assess how HIV risk was affected by residence in a SLH. Therefore, an additional inclusion criterion was HIV positive status or a lifetime history of at least one HIV risk behavior, which was broadly defined: men who had sex with men, commercial sex work, and injection drug use. Unprotected sex with two or more partners during the past six months qualified as an HIV risk as well.

Procedures

This study randomized 330 ex-offenders on probation or parole to a “Motivational Interviewing Case Management” (MICM) condition or residence in a SLH as usual. To avoid mixing individuals who received the intervention with individuals who did not within

the same house, we randomized at the house level. Once a house was randomized to a study condition, all of the individuals recruited from that house received the same intervention, MICM or SLH as usual. To avoid contamination of study conditions by gender, randomization procedures were stratified by houses for men, women, and both genders. Research interviews were conducted at baseline, 6 months, and 12 months. Follow-up interviews were conducted at a site that was the most comfortable for the participant, such as a SLH, the research project office, a new residence where the participant lived after leaving the SLH, or a park. The percent located and interviewed was 77% at 6 months and 81% at 12 months. Over 87% attended at least one follow-up interview. Among all participants who took part in the 6-month interview, the mean number of days to the 6-month interview was 190 days ($SD = 21$). The mean number of days to the 12-month interview was 386 days ($SD = 65$).

Structure of MICM Manual

Residents assigned to the MICM condition received individual, manual guided sessions over the 12-month period that they participated in the study. All sessions were provided free using grant funds budgeted for this purpose. MICM aimed to provide the most intensive help at the beginning of the residence in the house, so the goal was to meet with the client for three individual sessions within the first month. Thereafter, sessions occurred monthly throughout the 12-month time period. Sessions continued regardless of whether the resident had left the SLH. Initially, the overall goal was to help the incoming resident get access to the types of assistance they needed and settle into the SLH environment. After they left the SLH, the goal was to help them adapt to independent living in the community. The rationale for three sessions shortly after entering is that most residents who leave prematurely do so within the first few months. If the therapist can address issues that lead them to leave early, retention might be increased, thereby improving outcomes. Monthly sessions that occurred after the first three were designed to address successes, setbacks, and needed adjustments to the change plan. In addition to the standard sessions outlined in the manual, therapists were also available to address crises, such as psychiatric emergencies, arrests, or loss of job or housing.

Therapists aimed to conduct the first session in-person, but subsequent sessions could be conducted by phone when face-to-face meetings were not feasible. The first three sessions were designed to be an hour in length, but therapists could adjust the length depending their assessment of client needs. It was understood that some of the monthly sessions after the first three sessions would be brief, particularly when participants were functioning well and did not need addition help or services. It was also understood that some clients would relapse, resume an antisocial lifestyle, and therefore might not be interested in meeting with the therapist.

First Session—Although MICM was designed to adapt to the needs presented by the client, the MICM manual directs therapists in the first session to address a number of issues critical to successful adaptation to the community. These include problems that are common among criminal justice populations, such as the challenges of adapting to the new living environment at the SLH, plans for meeting financial obligations (e.g., rent), compliance with

the terms of probation or parole, and identification of other problems that require referrals to services in the community (e.g., medical, mental health, and job training). As problems are identified, the therapist and resident collaborate to develop a “change plan” to address each issue. The change plan includes strategies to address problem areas and may include accessing needed services in the community. For residents who present problems in multiple areas, development of the change plan can extend into additional sessions when necessary. Because the risk for HIV infection among criminal justice populations is exceedingly high (Leukefeld et al., 2009) and puts ex-offenders and their partners at risk, therapists also assess HIV status, history of HIV testing, and risk behaviors. Based on these the disposition of each client, options for HIV testing, referral for antiretroviral therapy for those who were infected, and referral to HIV risk reduction services are discussed.

Additional Sessions—A key focus for the second, third, and subsequent monthly sessions is to review what has occurred since the previous session. Which issues and concerns have improved? Which are worse? Has the resident used strategies identified in the “change plan?” What has been helpful and not helpful? What has been their experience making use of services to which they have been referred? What might they do differently to be more successful in their use of the services to which they have been referred? Have new, unanticipated issues arisen that need to be addressed? What changes need to be made in the change plan to better address current issues? Are their additional referrals to services that should be considered? Based on these discussions the change plan is updated and modified accordingly.

Therapist Training and Assessment of Adherence

Like our previous studies of MI-based interventions (e.g., Polcin, et al., 2014), the current study used licensed master’s level therapists to conduct MICM. All therapists were required to have previous clinical experience with MI, case management, and criminal justice populations. Our goal was to maintain two study therapists throughout the study who would conduct the MICM intervention. Training consisted of a 5-hour workshop conducted by the clinical supervisor that reviewed the basics of MI, procedures for the study, and the MICM manual. New therapists submitted at least two audiotapes of their initial sessions with clients and received feedback from the clinical supervisor. All in-person sessions were audiotaped. Most of the monthly sessions after the first three were conducted by phone and many were shorter periods of time. These sessions were not recorded. The clinical supervisor provided written feedback to therapists based on audiotaped sessions and met with them weekly by phone.

The clinical supervisor for the study assessed adherence to the manual using the Yale Adherence and Competence Scale (YACS II) system of monitoring behavioral interventions (Nuro et al., 2005). These ratings were primarily from the first three sessions, which were those most commonly audiotaped. Members of the study team have used the YACS II as a measure of adherence and competence in previous studies (e.g., Polcin, et al., 2014). The YACS II rates audiotaped sessions for frequency and skill level of therapist use of various MI interventions and provides cutoff points for the competent practice of MI. In addition to the YACS II, monitoring of adherence included a checklist of topics to be covered in the first

session, such as adaptation to the SLH environment, conditions of parole or probation, plans for work or job training, and identification of other problems that required referrals to services in the community (e.g., medical and mental health).

Comparison Condition

The comparison condition consisted of ex-offenders receiving SLH services as usual along with a list of resources that could be used to address a variety of problems. This procedure was designed to help ensure that the intervention effects for MICM were not simply the result of receiving information about various services that are available in the community.

Measures

Baseline Only—Demographic characteristics included gender, age, income, race, sexual orientation, legal status (dichotomized as currently on probation or parole; drug court offenders were classified as probationers), lifetime HIV testing and status, and lifetime number of months incarcerated. The DSM-IV Checklist was used to assess Alcohol and Drug Dependence over the past 12 months (American Psychiatric Association, 2000; Forman, Svikis, Montoya, & Blaine, 2004).

Primary Outcomes—The timeline Follow-Back (TLFB) measured days of alcohol and drug use over the past 6 months (Sobell et al., 1996). Overall severity of alcohol and drug problems over the past 30 days was measured by the Addiction Severity Index Lite (ASI) (McLellan et al., 1992).

Selected items from the Risk Assessment Battery (Metzger, Navaline, & Woody, 2001) were used to assess HIV risk over the past 6 months: injection drug use, needle sharing, condom use (coded as always/no sex versus less than always), number of sex partners over the past 6 months (coded as 0, 1 or 2+ partners), HIV testing over the past 6 months (yes/no), commercial sex work (yes/no) and men who had sex with men (yes/no).

Legal problems included number of arrests and convictions over the past 6 months. Overall legal severity over the past 30 days was assessed using the ASI Legal scale (McLellan et al., 1992).

Secondary Outcomes—Housing Status was defined as the primary living arrangement over the past 6 months categorized as home or apartment, marginally or temporarily housed, or homeless. Perceptions of housing status was assessed using a single question asking if the participant considered the current housing situation as stable versus not stable in the past 6 months.

The ASI Psychiatric scale was used to assess the severity of psychiatric problems.

Employment was assessed in two ways: a) days worked is a measure taken from Gerstein et al (Gerstein et al., 1994) and is a simple count of number of days worked over the past 6 months and b) the ASI Employment scale (McLellan et al., 1992).

Moderator Variables—To explore whether the MICM intervention varied among subgroups of residents we tested for moderating effects for demographic variables (e.g., sex, race, and age), motivation, 12-step involvement and social network characteristics.

Motivation was assessed using the Alcohol and Drug Consequences Questionnaire (Cunningham, et al., 1997), which is a scale designed to assess motivation for change by addressing the costs and benefits of changing alcohol and drug use. For persons who had established significant time in recovery, we used the scales as measures of costs and benefits to maintain sobriety. Reliabilities range from .73 to .89.

Involvement in 12-step recovery groups was assessed using the Alcoholics Anonymous Affiliation Scale: This measure includes 9 items and was developed by Humphreys, Kaskutas, and Weisner (1998) to measure the strength of an individual's affiliation with AA. We included involvement in other 12-step groups in addition to AA, such as Narcotics Anonymous (NA). We therefore refer to "12-step" affiliation throughout the paper rather than AA affiliation.

To assess drinking and drug use status in the social network we used the Important People Instrument (Zywiak, et al., 2002). The instrument allows participants to identify up to 12 important people in his or her network whom they have had contact with in the past six months. Information on the type of relationship, amount of contact over the past 6 months, and drug and alcohol use over the past 6 months was obtained for each person in the social network. The drinking status of the social network was calculated by multiplying the amount of contact by the drinking pattern of each network member, averaged across the network. The same method is applied to obtain the drug status of the network member; the amount of contact is multiplied by the pattern of drug use and averaged across network members

Analysis Plan

One goal of the analysis was to depict outcomes for the entire sample of persons on probation or parole who entered SLHs. In addition to depicting overall outcomes, we aimed to identify differences among demographic subgroups. Because involvement in 12-step recovery groups and drug and alcohol use in the social network predicted outcomes in a previous study of SLHs (Polcin, Korcha, Bond, & Galloway, 2010), we wanted to see if those findings could be replicated using the current sample. However, the primary aim of the study was to assess the effect of the MICM intervention at 6- and 12-month follow-up relative to the comparison condition. Because previous analyses of the baseline data revealed a variety of problems and deficits among the sample (Polcin, et al., 2017), we assessed a mix of primary outcomes, including legal problems, substance abuse, and HIV risk, and secondary outcomes, which included employment, psychiatric problems, and housing status. Although we did not have specific a priori hypotheses about moderator effects, we explored whether the effects of the MICM intervention varied by demographic characteristics, 12-step involvement, motivation, and characteristics of the social network.

To assess whether significant improvements were made between baseline and follow-up time points (6 and 12 months) and whether there were between group effects, we used two-level, mixed-effects random intercept models (also known as multilevel or hierarchical models).

These models adjust for the random influences of clustering. In this study, observations across time are clustered within individuals and individuals are clustered within SLHs and across time. We assume that observations in the same cluster are correlated because they share common cluster-level effects. Stated another way, 6- and 12- month outcomes are likely influenced by characteristics unique to each SLH, and the responses that individuals give at one point are likely related to their responses at a later time point. To account for the skew in the distribution of ASI scores, all ASI scores used in the multivariate models were natural log transformed with the addition of “1”. Separate models, estimated for the overall sample and each study condition, tested for treatment and time, and controlled for sex, age, education, ethnicity/race, LOS, and SLH residence.

Results

House Participation

To meet our recruitment goal of 330 individuals on probation or parole, we attempted to contact 96 SLHs in middle and lower income neighborhoods. Forty-nine houses agreed to participate and took part in the study. Eleven houses stated they were not interested in participating. We did not collect formal data on reasons for refusal, but these houses tended to express concerns about confidentiality or felt they did not need the MICM intervention to supplement what they offered. This was particularly the case for houses that were affiliated with outpatient treatment or were stepdown houses.

Most of the nonparticipating houses were what we called “passive referrals,” ($n = 36$). These included some houses that did not return our phone calls or failed to attend scheduled meetings to discuss the study. Others initially agreed to participate but never followed through with necessary paperwork or other required procedures. Anecdotal reports from fieldwork staff suggest most of these owners and managers were very busy with managing the houses and had many other activities to attend to (e.g., most managers worked elsewhere full-time). Thus, they may have felt they did not have time to participate.

Although there may have been differences between houses that participated and those that did not, there were a number of similar characteristics that are known. All potential houses for the study were identified through the Sober Living Network (SLN), so houses that did and did not participate were held to identical standards for health, safety, and operations of the facilities. In addition, nonparticipating houses were in the same neighborhoods as participating houses and had similar rents for the residents.

In addition, our analytic focus for this study was on individual outcomes over time and assessment of differences between the two study conditions. We were not focused on house characteristics as predictors of outcome and we controlled for SLHs where residents lived in our multivariate models.

Characteristics of Participating Houses

Of the 49 SLHs recruited, 25 were for men, 9 were for women, and 15 were for both men and women. Sixty nine percent of the houses were freestanding (227 participants) and 31% were stepdown houses (103 participants). Stepdown houses were residences for persons who

completed a structured inpatient program. On average, houses had 20 beds and rent ranged from \$375 per month to \$1,500 per month. The average cost was \$598. The proportions of parolees and probationers in houses varied. However, only 28% of the participating houses indicated that a majority of residents had a criminal justice status.

Twenty-one houses were assigned to the MICM (149 participants) and 28 to the control condition (181 participants). To achieve our recruitment goals and our desire to examine houses in different parts of Los Angeles we focused data collection efforts on three areas where the SLN indicated there were a higher concentration of low- and middle-income houses (i.e., West Los Angeles, Central Los Angeles, the San Fernando Valley, and Long Beach).

Individual Characteristics

To recruit the targeted number of probationers and parolees ($N = 330$) we screened 916 persons entering 49 SLHs. The majority of those who were screened out were excluded because they did not have a criminal justice status ($N = 335$). In addition, 130 who met the criminal justice criteria were screened out because they did not meet the HIV criteria. However, HIV risk among ex-offenders entering the houses was substantial. Nearly three fourths (74%) reported HIV risk behaviors (68%) or infection with HIV disease (6%). The level of resident participation was very high. Only 6 residents who were invited to participate declined.

Table 1 shows participant characteristics. Slightly more than a quarter of the sample were women (26%) and a majority were nonwhite (53%). The mean age was 38.6 ($SD = 11.8$) and slightly over a third (36%) had some education beyond high school. Over two thirds (67%) had never been married. Eighteen percent indicated they were homeless or living in a shelter prior to entering the SLH and over three quarters indicated they were in an unstable or temporary living arrangement. These most commonly included residential treatment (33%) or incarceration (21%). The most common drug problems during the past six months were methamphetamine (41%), alcohol (35%), opiates (16%), and marijuana (16%). Over 84% indicated their yearly income was \$12,000 or less per year.

Criminal justice status included 25% of the sample on parole and 75% on probation or drug court. Lifetime involvement in the criminal justice system (not shown in the table) was substantial. Over participants' lifetimes, the mean number of arrests was 20 ($SD = 28$) and lifetime incarceration averaged 92 ($SD = 116$) months. At the baseline interview, 41% reported spending time in jail over the past six months and 20% reported spending time in prison.

MICM Attendance and Manual Adherence

The MICM intervention was designed to provide three sessions within the first few weeks after entering the house and monthly sessions thereafter. However, involvement in MICM varied dramatically, as did the time points at which residents attended sessions. Of the 149 participants residing in houses that were randomized to the MICM condition, 30% did not attend any sessions with the therapist and 25% attended one or two sessions. However, by the 6-month interview, 45% had attended three or more sessions. Although 76% of those

who attended at least one session were seen within one month of entering the study, the range was from 0 days to 310 days. The median time to the first session after entering the study was 14 days. For the first 3 sessions, 70% of the sessions were in-person. For sessions after the first three, 54% were conducted by phone.

A random selection of 61 sessions (13% of the total number of sessions conducted and 53% of the sessions recorded) were rated by the clinical supervisor of the study using the Yale Adherence and Competence Scale (YACS II) system of monitoring behavioral interventions (Nuro et al., 2005). These were all in-person sessions. They consisted primarily of the first three sessions, which were the sessions most commonly audiotaped and conducted in person. Telephone sessions were not audiotaped or rated. Therapists consistently scored well above the minimum standard on YACS measures of frequency of MI interventions and skill level. One of the study therapists was a consistent part of the study throughout most of the clinical intervention period. However, as described below in the discussion section, there were a variety of challenges to the clinical work that led to rapid turnover of other therapists.

Because there were a large number of residents in the MICM condition who did not receive any MICM sessions ($n = 44$, 30%), we conducted two types of analyses comparing study conditions, intent to treat analyses (ITT) and a modification of per protocol (PP) analyses. The ITT analyses included all study participants who enrolled in the study. Residents assigned to the MICM condition were included in the analyses even if they never attended any MICM sessions. Because it would not be expected that an individual would benefit from a treatment if they never received that treatment, we also used a modified PP analysis (Gupta, 2011; Porta, Bonet, & Cove, 2007) in addition to ITT to compare study conditions. Using standard PP procedures, researchers only include participants who were completely compliant with all aspects of the protocol, including receipt of all of the study interventions. Because many community based studies, including the current study, would exclude too many participants using this strict criteria, we chose to use a modified PP approach that excluded only persons in the MICM condition who did not receive any sessions. Following recommendations from Porta, Bonet and Cove (2007) the results reported below include ITT and modified PP analyses.

Descriptive Analysis

Table 2 shows baseline, 6-month, and 12-month unadjusted outcomes for the total sample and all three study conditions: control group, MICM ITT, and MICM PP. Overall, there is clear evidence of improvement between baseline and follow-up time points for all primary (substance abuse, criminal justice, and HIV risk) and secondary (employment, psychiatric, and housing) outcome variables across all study conditions. In addition, there are a few examples where the MICM conditions (MICM ITT and MICM PP) made relatively larger gains than the control group. These were most evident on criminal justice measures such as arrests, incarcerations, convictions, and ASI legal. For example, the ASI legal scale for the PP group declined from a mean of $.19$ ($SD = .18$) at baseline to a mean of $.08$ ($SD = .15$) at 12 months. Both the ITT and control groups had slightly lower severity at baseline and higher severity at 12 months. The ITT group declined from a mean of $.17$ ($SD = .18$) at baseline to a

mean of .09($SD = .16$) at 12 months. The control group declined from a mean of .18($SD = .19$) to a mean of .13($SD = .21$).

Multivariate Analysis

Mixed models compared baseline assessments with 6- and 12-month outcomes for all outcome variables. Separate longitudinal analyses were conducted for each of the groups, including the entire sample ($N = 330$), the control group ($n = 181$), the MICM group using ITT ($n = 149$) and the MICM group using PP ($n = 105$). In addition, time by condition assessments were conducted using ITT and PP methods and we explored whether a variety of variables moderated the effects of MICM.

Drug and Alcohol Outcomes—Outcomes for the alcohol and drug variables are shown in Table 3. Compared to baseline, all groups except the PP condition showed significant improvement at 12 months on the ASI alcohol scale, the ASI drug scale, and 6-month abstinence. Most of the alcohol and drug variables for these groups also showed significant improvement at 6 months. One exception was the ASI drug scale for the control group. When we explored predictors of outcome for the entire sample of 330 residents (not shown in the table) we found 12-step involvement [OR = 1.2, CI = 1.1–1.3], drinking status of the social network [OR = 0.5, CI = 0.4–0.7], and drug use status of the social network [OR = 0.4, CI = 0.2–0.5] predicted abstinence over a 6-month period of time.

The lack of significant reduction for the PP group is likely due to low statistical power to detect differences because of the smaller N for this group. As shown in the table, analyses for the PP condition had 105 participants, versus 181 for the control group and 149 for the MICM group. Beta coefficients and odds ratios comparing baseline to 6 and 12 months on alcohol and drug outcomes were similar to the ITT and control groups. In addition, Table 2 shows that 12-month outcomes for ASI drug, ASI alcohol, and abstinence were similar.

There were no significant time by condition interactions for alcohol and drug variables in our ITT or PP analyses, indicating no effect for MICM on these outcomes. However, when we explored whether the findings differed for various subgroups within the sample (e.g., gender, race, age, motivation, psychiatric severity, and 12-step involvement), we found significant differences between study conditions for women (not shown in the table). Women assigned to MICM reported higher rates of abstinence at 12 months compared to the control group. This was the case for the ITT analysis [OR = 0.15, CI = 0.02–0.94] as well as the PP analysis [OR = 0.10, CI = 0.01–0.68].

Criminal Justice Outcomes—Table 4 shows there were consistent improvements over 12 months on a variety of criminal justice outcomes, including the ASI legal scale, arrests, any incarcerations, and any convictions. Relative to baseline, all four groups showed significant improvements on all criminal justice variables at 6 and 12 months. The only exception was arrests at 6 months for the control group.

There was one significant condition by time interaction using the ITT analysis. At 6 months, persons assigned to the MICM condition had better outcomes on the ASI legal scale than those assigned to the control group. Using the PP analysis, where persons assigned to MICM

had to attend at least one session to be included in the analysis, we saw a number of significant time by condition interactions favoring MICM over the control group. At 6 and 12 months, ASI legal scores and a dichotomous measure of incarceration over 6 months were significantly lower for the MICM condition. At the 6-month time point, arrests and convictions were lower among persons in the MICM condition.

HIV Risk Behaviors—There was significant reduction in HIV risk in terms of reduced needle use and needle sharing (Table 5). All three study conditions showed significant declines at 6 and 12 months on both of these variables. Although there was improvement at 6 and 12 months on other HIV variables, significant effects varied across the groups examined. For example, relative to baseline, condom use increased significantly at 6-month follow-up among the ITT and control groups. Although there was an increase in condom use at 6 and 12 months among persons in the PP group, the magnitude of improvement was not statistically significant. At 12 months, only the control group showed a significant increase relative to baseline. For number of sex partners and engaging in commercial sex work variables, we saw significant improvement only for the control group at 12 months. Compared to baseline, participants in the control group at 12 months were nearly 3.5 times more likely to avoid sex work and nearly twice as likely to not have two or more sex partners. At 6 months, significant improvement from baseline for sex work was noted only for the PP group [OR = 4.00, CI = 1.01– 15.86]. The ITT group did not show significant improvement at 12 months for either of these variables at either time point. When we tested time by condition interactions using ITT and PP analyses we saw no significant associations, which suggest MICM does not appear to impact HIV risk behaviors.

Employment, Housing, and Psychiatric Outcomes—In addition to the primary outcomes, we assessed the secondary outcomes indicated in Table 6. The clearest finding was on employment. Days employed over the past 6 month showed significant improvement relative to baseline at 6 and 12 months across all groups. ASI employment showed modest improvement. However, only the number of days employed could be estimated in the multivariate models. ASI employment models failed to converge due to lack of adequate variability within individuals across time.

The findings for housing were more mixed. At 6 months, there was a significant decrease in homelessness relative to baseline. Within each of the three conditions, participants were at least twice as likely to avoid homelessness compared to baseline. At 12 months there was a directional trend toward lower homelessness relative to baseline. However, the magnitude of improvement did not reach statistical significance at 12 months for any of the groups. Nevertheless, perceptions of housing instability improved at both 6- and 12-month follow-up relative to baseline. At 12 months, across the three groups participants were two to three and one-half times more likely to view their housing as stable.

Finally, there were significant improvements noted on the ASI psychiatric severity scale for most groups at 6- and 12-month follow-up. The two exceptions were the ITT group at 6 months and the control group at 12 months. There were no significant time by condition interactions for these variables, suggesting the MICM did not impact these secondary outcomes.

Discussion

Criminal Justice Outcomes

Attendance at one or more MICM sessions was shown to benefit residents in terms of improved criminal justice outcomes. Relative to the control group, residents who attended one or more MICM sessions (i.e., the PP group) had better outcomes on measures of arrests, convictions, incarceration, and severity of legal problems. It is important to note that the MICM manual targeted legal issues during the first session. Therapists were directed to initiate discussion about the terms of probation or parole and elicit discussion of a plan for compliance. Using the collaborative style of MI, therapists and clients identified potential challenges and obstacles to compliance. Specific actions that supported compliance were then worked into the change plan.

There are a few ways that MICM may have been helpful in terms of reducing legal problems. First, the challenges of complying with the terms of probation or parole were identified and discussed within the context of a supportive relationship. Unlike probation and parole officers, the study therapists had no power to implement consequences for noncompliance. This may have resulted in a more open and honest assessment of potential obstacles to compliance and more realistic plans for addressing them. Part of the role of probation and parole officers is to monitor and enforce compliance with criminal justice mandates. Those tasks contrast markedly from the support and collaboration emphasized in MICM. In addition, because SLHs do not offer any type of onsite services, there may have been few opportunities other than the MICM sessions to examine the terms of probation or parole and ways to comply with them. Finally, MICM may have been helpful for legal issues because they could be discussed as circumstances changed over time. Unlike standard MI, the MICM change plan was implemented over the course of a year. That allowed for updating strategies that supported compliance and addressed new obstacles as they emerged.

Additional Primary and Secondary Outcomes

It is unclear why residents in the MICM condition had more favorable criminal justice outcomes than persons in the control group but did not differ on other primary or secondary outcomes. This question requires additional research. Targeted qualitative interviews addressing legal and other issues among residents who received MICM could be helpful. However, some of the outcomes examined, such as drug and alcohol use, received substantial focus among all residents within the houses and that could be one factor mitigating the impact of MICM. Abstinence was required in all of the houses and residents were expected to support one another's recovery efforts. In addition, residents were typically required or encouraged to attend 12-step groups. Because residents were already getting substantial support for abstinence, alcohol and drug use may have been less impacted by MICM sessions.

Another factor influencing the lack of impact of MICM on outcomes could be receipt of services prior to residence the SLH. A previous analysis of the sample at baseline (Polcin, et al., 2017) showed probationers and parolees entering SLHs engaged in a variety of services prior to entering the houses, including receipt of psychiatric medications (42%), counseling

(42%), and HIV testing/counseling (20%). One-third indicated they were in some type of residential treatment program before entering the house.

Moderator Effects

In addition to examining the overall effect of MICM, the study also aimed to explore whether subgroups of residents benefited differentially. We therefore conducted a series of moderator analyses for the primary outcomes. These exploratory analyses examined factors such as race, age, motivation, social support, 12-step involvement, and psychiatric severity. The only variable that moderated the effect of MICM on outcome was the effect of gender on abstinence. Women in the MICM condition had better outcomes on abstinence at 12-month follow-up than women in the control group. This finding held for both the PP and ITT analyses.

There are a few caveats that need to be noted about the moderating effect of gender on abstinence. First, there were no moderating effects for gender on other variables, including those related to substance use (i.e., ASI alcohol and drug scales). Second, there were no moderating effects noted at 6 months; it was only at the 12-month point that moderation was noted. However, it is possible that there is a delayed effect for the impact of MICM on abstinence among women. In a different study of an MI-based intervention (i.e., Intensive Motivational Interviewing), Korcha et al., (2014) found women benefited from the intervention in terms of reduced alcohol problems while men did not. In addition, the strongest differences between the intervention and control groups emerged at 6 months and were not present at earlier time points (i.e., 2 and 4 months).

Findings for the Total Sample

When we examined longitudinal outcomes for the total sample and within group analyses of each of the study conditions, we found clear evidence of multiple areas of improvement over time. Regardless of study condition, there were significant improvements on measures of alcohol and drug use, severity of alcohol and drug problems, legal problems, HIV risk, psychiatric problems, employment, homelessness, and perceptions of housing stability. Because entering a SLH was associated with multiple benefits for persons on probation or parole, it should be considered as an important referral resource for parole and probation officers. Moreover, because multivariate models controlled for the influence of demographic variables, as well as length of stay, the findings appear to be generalizable to a broad cross-section of probationers and parolees. Because models controlled for house effects, the findings appear to be applicable to a variety of SLH residences. Results also supported some central tenets of social model recovery: involvement in 12-step recovery groups and social support for recovery. Study findings replicated previous studies of SLHs that showed more involvement in 12-step groups and less drug and alcohol use in residents' social networks were strong predictors of abstinence.

Challenges to Implementing the Intervention

The types of challenges inherent in studying recovery residences in the community have been described in detail by Polcin et al. (2016). Examples include garnering buy-in from house operators and residents, coordinating collection of data from multiple sites, and

locating residents for follow-up interviews. In the current study, challenges included issues such as recruiting participants into the study soon after they entered SLHs, arranging research and therapy interviews according to study timelines, allocating resources to efficiently study houses located in different areas of Los Angeles, and retaining study therapists.

One implication of these challenges for the current study was many persons assigned to the MICM intervention condition did not receive any MICM sessions ($n = 44$, 30%). Others did not receive sessions until they were already enrolled in the study for months, and still others only had contact with study therapists over the phone, which was not our original intent. Feedback from study therapists suggested that some participants were not motivated to attend sessions because they felt their needs were already being met either by current services they were receiving or services they received prior to entering the SLH. Other persons assigned to the MICM condition were discouraged by therapist turnover. After being assigned to meet with a therapist and then learning that person had resigned, they needed to wait until a new therapist was hired and trained. Although one therapist was a consistent presence throughout most of the study, many therapists were not prepared for the time required to visit houses in various parts of Los Angeles or locate clients who had left the houses and were living elsewhere. The differences between delivery of typical therapy services in treatment programs and therapy procedures used for this study were significant and some therapists had difficulty adapting to the differences. Because we did not believe residents who did not attend any sessions would benefit, we reported results using a modified per protocol analysis (attendance at one or more sessions) in addition to the standard ITT method.

Conclusions and Implications for SLH Operations

Despite recent calls within the U.S. Department of Justice for a return to the discredited “get tough on crime” approach to drug offenses (Polcin, 2018), criminal justice institutions at all levels continue to emphasize alternatives to incarceration. For many probationers and parolees, successful adaptation to life in the community will require access to affordable, alcohol- and drug-free housing that supports sustained recovery. Our findings suggest SLHs can play an important role in this regard. The following points summarize our conclusions and suggestions for operation of SLHs.

First, probation and parole professionals should consider SLHs as housing options for persons with drug and alcohol related offenses. Our findings show that probationers and parolees who enter SLHs make significant improvement in multiple areas of functioning between entry into the houses and 12-month follow-up.

Second, despite significant improvements overall, some probationers and parolees continued to struggle. For example, some left the residence prematurely and others had difficulty engaging in 12-step recovery programs, both of which were associated with worse outcome. Some of these individuals may benefit from residences that offer a higher level of structure and on-site services to address problems (e.g., see Mericle, Miles, & Cacciola, 2015).

Third, study findings suggest that criminal justice outcomes (arrests, convictions, incarceration and severity of legal problems) can be improved if houses implement the new MICM intervention. Because this was a research study, implementation of MICM was constrained by a variety of procedural demands. These included random assignment of participants to MICM regardless of motivation to receive the intervention, attempts to systematize the number and frequency of sessions regardless of participants' needs, and coordination of sessions at multiple data collection sites, which fueled therapist turnover. Use of MICM in SLHs might be improved by considering the following modifications: a) Making MICM voluntary for persons who are motivated and meeting with therapists on an as needed basis. b) Having one therapist onsite at a specific time each week when they would be available to meet with residents. c) Considering whether house managers could be trained to provide the essential elements of MICM during their daily interactions with residents.

Fourth, in terms of supporting longer-term abstinence, MICM might be best targeted for women because those who received MICM had better abstinence rates at 12 months than those who did not. These findings are consistent with a previous study of an MI-based intervention that also showed efficacy for women but not for men (Korcha, et al., 2014). However, differential outcomes by gender found in the current study requires more research because abstinence did not differ at 6 months, nor did other outcome measures, including ASI alcohol and drug severity

Limitations and Additional Research

Additional research is needed to address a variety of limitations evident in the current study. First, studies are needed on SLHs in other geographic areas that differ from Los Angeles. Results from the study may not generalize to areas with less diversity, fewer auxiliary services, or fewer houses. Second, because our study was an initial examination of criminal justice involved residents in SLHs, we chose to take a broad view that examined a large number of primary, secondary, and moderator variables. Additional studies are needed to replicate our findings. Third, the aforementioned considerations for modifying implementation of MICM in SLHs need to be studied to assess how they affect outcomes. Fourth, our multivariate models controlled for houses where participants resided. Studies are needed that parse out relative influences of house characteristics on outcome and ways that individual and house level variables interact. Finally, some of the confidence intervals for odds ratios were large, reflecting some degree on instability in the findings. This was primarily evident on legal measures, where some of the N's were small, particularly for arrests and incarcerations.

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Table 1

Demographic characteristics of the sample (N = 330)

	Control (n =181)	MICM (n = 149)	Total (N= 330)
Gender			
Male	77.4	70.5	74.2
Female	22.7	29.5	25.8
Marital Status			
Never married	68.0	66.4	67.3
Married/live-in partner	5.0	6.7	5.8
Div/Sep/Wid	27.1	26.9	27.0
Education			
LE HS diploma	65.2	63.1	64.2
GT HS diploma	34.8	36.9	35.8
Sexual Orientation			
Heterosexual	83.4	85.2	84.2
Gay/lesbian/Bisexual/Other	16.6	14.8	15.8
MSM – lifetime	15.0	16.2	15.5
HIV+	5.0	7.4	6.1
Race/ethnicity			
White	48.1	45.6	47.0
African-American	18.8	30.9	24.2
Hispanic	22.1	15.4	19.1
Other/mixed	11.0	8.0	9.7
Housing prior to SLH			
Own home/apartment	4.4	4.0	4.3
Temporarily housed (doubled up)	78.4	76.5	77.6
Homeless/no fixed housing	17.1	19.5	18.2
Perceived unstable living situation	54.1	51.0	52.7
Legal Status (at baseline)			
Probation [(including drug court)	71.4	79.0	74.9
Parole	28.6	21.0	25.1
DSM-IV dependence past 12 months			
Alcohol	35.4	33.6	34.6
Methamphetamine	41.4	40.3	40.9
Marijuana	15.5	16.8	16.1
Opiates	21.0	16.8	19.1
Continuous measures (SD)			
Mean Age (SD)	38.1 (11.9)	39.3 (11.6)	38.6 (11.8)
Income			
\$0-\$12,000	81.2	88.6	84.5
Over \$12,000	18.8	11.4	15.5

Note: No significant differences were observed between control and treatment conditions.

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Table 2

Descriptive statistics of primary and secondary outcome measures

	Total sample <i>N</i> = 330	MICM Per Protocol (PP) <i>n</i> = 105	Control <i>n</i> = 181	MICM Intent to Treat (ITT) <i>n</i> = 149
<u>Continuous Measures</u>	Mean(<i>SD</i>)	Mean(<i>SD</i>)	Mean(<i>SD</i>)	Mean(<i>SD</i>)
ASI Drug				
Baseline	.08 (.10)	.08 (.09)	.08 (.10)	.09 (.10)
6-month	.06 (.10)	.05 (.08)	.06 (.10)	.06 (.10)
12-month	.06 (.09)	.05 (.08)	.06 (.09)	.05 (.09)
ASI Alcohol				
Baseline	.14 (.19)	.15 (.18)	.13 (.19)	.15 (.19)
6-month	.10 (.18)	.09 (.12)	.10 (.19)	.09 (.16)
12-month	.09 (.18)	.10 (.17)	.08 (.19)	.10 (.18)
ASI Legal				
Baseline	.18 (.19)	.19 (.18)	.18 (.19)	.17 (.18)
6-month	.11 (.18)	.06 (.13)	.13 (.19)	.08 (.16)
12-month	.11 (.19)	.08 (.15)	.13 (.21)	.09 (.16)
ASI Employment				
Baseline	.85 (.20)	.85 (.19)	.84 (.20)	.85 (.20)
6-month	.76 (.26)	.78 (.25)	.74 (.27)	.78 (.25)
12-month	.74 (.27)	.76 (.26)	.73 (.27)	.76 (.26)
# days employed				
Baseline	21.35 (40.36)	17.95 (36.47)	23.25 (43.33)	19.03 (36.44)
6-month	41.79 (53.87)	38.29 (51.10)	45.12 (56.97)	37.32 (49.30)
12-month	47.27 (59.01)	48.38 (60.37)	49.08 (60.05)	44.97 (57.82)
ASI Psychiatric				
Baseline	.29 (.25)	.30 (.25)	.29 (.25)	.30 (.25)
6-month	.24 (.25)	.24 (.24)	.25 (.26)	.24 (.23)
12-month	.25 (.25)	.25 (.24)	.25 (.24)	.25 (.25)
Dichotomous measures				
	%	%	%	%
TLFB Abstinent				
Baseline	31.5	39.0	30.4	32.9
6-month	45.8	49.4	43.4	49.1
12-month	47.0	48.3	47.5	47.2
Any arrests				
Baseline	31.8	28.6	34.8	28.2
6-month	19.8	6.9	25.5	12.0
12-month	22.7	13.3	25.8	18.6
Any incarceration				
Baseline	58.8	56.2	61.3	55.7

Continuous Measures	Total sample	MICM	Control	MICM
	<i>N</i> = 330	Per Protocol (PP)	<i>n</i> = 181	Intent to Treat (ITT)
	Mean(<i>SD</i>)	Mean(<i>SD</i>)	Mean(<i>SD</i>)	Mean(<i>SD</i>)
6-month	20.2	8.0	25.5	13.0
12-month	25.7	12.6	30.0	20.3
Any convictions				
Baseline	34.2	31.4	35.9	32.2
6-month	14.6	4.6	18.6	9.3
12-month	19.0	12.6	20.5	16.9
Literal homelessness				
Baseline	19.0	18.1	17.9	20.3
6-month	10.9	10.3	10.7	11.1
12-month	13.6	10.6	14.1	12.9
Perceived housing instability				
Baseline	47.3	41.0	45.9	49.0
6-month	34.0	25.3	37.9	28.7
12-month	30.6	24.1	32.0	28.8
Any needle use				
Baseline	23.0	19.0	24.9	20.8
6-month	13.0	10.3	13.8	12.0
12-month	13.4	10.3	14.0	12.7
Needle sharing				
Baseline	17.0	15.2	18.2	15.4
6-month	9.5	5.7	10.3	8.3
12-month	10.1	6.9	10.7	9.3
Condom use				
Baseline	27.7	30.8	26.1	29.7
6-month	37.2	40.2	35.2	39.8
12-month	34.0	32.2	36.0	31.4
2+ Sexual partners				
Baseline	47.7	42.3	49.4	45.6
6-month	42.3	37.9	46.2	37.0
12-month	37.3	34.5	38.0	36.4
Sex work				
Baseline	12.7	11.4	14.4	10.7
6-month	9.1	3.4	11.0	6.5
12-month	5.6	4.6	6.0	5.1

Note: ASI scale mean scores are raw scores (not transformed).

Table 3

Drug and alcohol problem severity and abstinence outcomes measures over time using mixed-effects regression models

	Total sample		Stratified by condition	
	<i>N</i> = 330	MICM Per Protocol (PP) <i>n</i> = 105	Control <i>n</i> = 181	MICM Intent to Treat (ITT) <i>n</i> = 149
	<i>Coef</i> [95% <i>CI</i>]	<i>Coef</i> [95% <i>CI</i>]	<i>Coef</i> [95% <i>CI</i>]	<i>Coef</i> [95% <i>CI</i>]
ASI Drug (logged)				
Baseline (ref)	---	---	---	---
6-month	-.49 [-.88, -.11]*	-.48 [-1.17, .21]	-.30 [-.81, .21]	-.75 [-1.36, .14]*
12-month	-.55 [-.92, -.17]**	-.56 [-1.24, .12]	-.51 [-1.02, -.01]*	-.59 [-1.16, -.01]*
ASI Alcohol (logged)				
Baseline (ref)	---	---	---	---
6-month	-.65 [-1.07, -.23]**	-.53 [-1.23, -.16]	-.64 [1.22, -.07]*	-.67 [-1.28, -.05]*
12-month	-1.05[-1.48, -.63]***	-1.08 [-1.79, -.36]**	-1.22 [-1.82, -.62]***	-.88 [-1.49, -.28]**
	<i>OR</i> [95% <i>CI</i>]	<i>OR</i> [95% <i>CI</i>]	<i>OR</i> [95% <i>CI</i>]	<i>OR</i> [95% <i>CI</i>]
TLFB Abstinent Dichotomized				
Baseline (ref)	---	---	---	---
6-month	2.63 [1.65, 4.18]***	2.05 [.97, 4.34]	2.65 [1.38, 5.10]**	2.61 [1.35, 5.03]**
12-month	2.94 [1.84, 4.64]***	1.93 [.92, 4.07]	3.48 [1.82, 6.65]***	2.46 [1.30, 4.63]**

Note: Coefficients and odds ratios have been adjusted for sex, age, education, race/ethnicity, LOS, and SLH residence. No significant interactions between treatment condition and time were observed for the intent to treat sample or the per protocol sample.

*
p < .05;

**
p < .01,

p < .001

Table 4

Legal Outcome measures over time using mixed-effects regression models

	Total sample	Stratified by condition			Interaction Models		
		MICM Per Protocol (PP) n = 105	Control n = 181	MICM Intent to Treat (ITT) n = 149	Time by Condition ITT	Time by Condition PP	Time by Condition PP
ASI Legal (logged)							
Baseline (ref)	---	---	---	---	---	---	---
6-month	-1.37 [-1.80, -.95] ***	-2.82 [-3.82, -1.83] ***	-1.01 [-1.56, -.46] ***	-1.84 [-2.52, -1.15] ***	-0.93 [-1.76, -.10]*	-1.63 [-2.60, -.65] **	
12-month	-1.37 [-1.79, -.96] ***	-2.66 [-3.65, -1.67] ***	-1.10 [-1.64, -.55] **	-1.71 [-2.37, -1.06] ***	ns	-1.34 [-2.29, -.38] ***	
	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]	
No Arrests							
Baseline (ref=arrested)	---	---	---	---	---	---	---
6-month	2.25 [1.44, 3.51] ***	7.65 [2.63, 22.29] ***	1.82 [1.03, 3.21]*	3.26 [1.55, 6.86]**	ns	4.44 [1.37, 14.45]*	
12-month	1.78 [1.17, 2.71]**	3.28 [1.39, 7.75]**	1.69 [.97, 2.95]	1.89 [1.00, 3.57]	ns	ns	
No Incarceration(s)							
Baseline (ref=incarcerated)	---	---	---	---	---	---	---
6-month	11.96 [6.95, 20.58] ***	26.51 [8.37, 83.99] ***	9.03 [4.63, 17.61] ***	17.94 [7.03, 45.76] ***	ns	3.83 [1.21, 12.18]*	
12-month	7.68 [4.68, 12.60] ***	16.26 [5.67, 46.57] ***	6.39 [3.43, 11.89] ***	9.94 [4.35, 22.70] ***	ns	3.12 [1.09, 8.95]*	
No Convictions							
Baseline (ref=convicted)	---	---	---	---	---	---	---
6-month	3.66 [2.29, 5.86] ***	2.93 [1.61, 5.34] ***	2.93 [1.61, 5.34] ***	5.68 [2.56, 12.63] ***	ns	4.89 [1.32, 18.05]*	
12-month	2.57 [1.67, 3.94] ***	2.54 [1.43, 4.51]**	2.54 [1.43, 4.51]**	2.72 [1.42, 5.19]**	ns	ns	

Note: Coefficients and odds ratios have been adjusted for sex, age, education, race/ethnicity, LOS, and SLH residence.

* p < .05;

100' > d

'10' < d
**

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Table 5

HIV risk outcome measures over time using mixed-effects regression models

	Stratified by condition			
	Total sample	MICM Per Protocol (PP) n = 105	Control n = 181	MICM Intent to Treat (ITT) n = 149
No needle use				
Baseline (ref=needle use)	---	---	---	---
6-month	3.53 [1.88, 6.63]***	4.77 [1.28, 17.81]*	3.61 [1.59, 8.19]**	3.37 [1.26, 9.00]*
12-month	3.25 [1.77, 5.95]***	5.12 [1.38, 18.99]*	3.44 [1.54, 7.68]**	2.98 [1.19, 7.45]*
Needle Sharing				
Baseline (ref=needle sharing)	---	---	---	---
6-month	3.19 [1.61, 6.31]**	7.91 [1.55, 40.34]*	2.96 [1.25, 7.01]*	3.62 [1.18, 11.11]*
12-month	2.74 [1.43, 5.24]**	6.04 [1.32, 27.75]*	2.68 [1.16, 6.19]*	2.90 [1.04, 8.12]*
Condom Use				
Baseline (ref=no condom use)	---	---	---	---
6-month	1.90 [1.21, 2.97]**	1.74 [.86, 3.54]	1.99 [1.05, 3.75]*	1.93 [1.02, 3.68]*
12-month	1.54 [1.00, 2.39]	1.06 [.52, 2.16]	2.13 [1.14, 3.97]*	1.12 [.60, 2.08]
0 or 1 Sex Partner				
Baseline (ref=2+ sex partners)	---	---	---	---
6-month	1.25 [.84, 1.86]	1.24 [.63, 2.46]	1.09 [.64, 1.88]	1.47 [.81, 2.68]
12-month	1.74 [1.17, 2.59]**	1.46 [.74, 2.88]	1.84 [1.07, 3.18]*	1.60 [.90, 2.85]
No sex work				
Baseline (ref=sex work)	---	---	---	---
6-month	1.78 [.96, 3.31]	4.00 [1.01, 15.86]*	1.60 [.75, 3.43]	2.23 [.76, 6.53]
12-month	3.09 [1.54, 6.20]**	2.24 [.71, 7.02]	3.45 [1.40, 8.46]*	2.66 [.88, 8.04]

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Note: Coefficients and odds ratios have been adjusted for sex, age, education, race/ethnicity, LOS, and SLH residence

No significant interactions between treatment condition and time were observed for the intent to treat or the per protocol samples.

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

Table 6
Employment, psychiatric, and housing outcome measures over time using mixed-effects regression models

	Stratified by condition			
	Total sample N = 330	MICM Per Protocol (PP) n = 105	Control n = 181	MICM Intent to Treat (ITT) n = 149
	Coef[95% CI]	Coef[95% CI]	Coef[95% CI]	Coef[95% CI]
Number Days Employed				
Baseline (ref)	---	---	---	---
6-month	.72 [.29, 1.15]**	.73 [.28, 1.18]**	.73 [.14, 1.32]*	.72 [.09, 1.35]*
12-month	.83 [.41, 1.25]***	.92 [.47, 1.37]***	.89 [.30, 1.47]**	.77 [.16, 1.37]*
ASI Psych (logged)				
Baseline (ref)	---	---	---	---
6-month	-.46 [-.93, .02]	-.51 [-1.01, -.01]*	-.66 [-1.29, -.02]*	-.21 [-.93, .52]
12-month	-.64 [-1.10, -.17]**	-.72 [-1.21, -.22]**	-.46 [-1.09, .16]	-.89 [-1.60, -.18]*
	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]
No homelessness				
Baseline (ref=homeless)	---	---	---	---
6-month	2.53 [1.39, 4.62]**	2.44[1.28, 4.66]**	2.42 [1.09, 5.39]*	2.60 [1.04, 6.50]*
12-month	1.51 [.88, 2.59]	1.57 [.86, 2.86]	1.25 [.61, 2.56]	1.97 [.85, 4.55]
Perceived stable housing				
Baseline (ref=unstable housing)	---	---	---	---
6-month	1.90 [1.27, 2.84]**	1.73 [1.13, 2.64]*	1.43 [.86, 2.37]	2.97 [1.51, 5.85]**
12-month	2.47 [1.65, 3.69]***	2.33[1.51,3.60]***	2.01 [1.20, 3.35]**	3.46 [1.77, 6.75]***

Note: Coefficients and odds ratios have been adjusted for sex, age, education, race/ethnicity, LOS, and SLH residence.

No significant interactions between treatment condition and time were observed for the intent to treat or the per protocol samples.

* p < .05;

100 > d

;10 < d
**

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