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## Substance Abuse Treatment Patients in Housing Programs Respond to Contingency Management Interventions

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### ABSTRACT

Use of homeless and transitional housing (e.g., recovery homes) programs can be associated with success in substance abuse treatment, perhaps because many of these programs encourage or mandate sobriety. In this study, we examined whether contingency management (CM) protocols that use tangible incentives for submission of drug-free specimens or other specific behaviors are effective for treatment-seeking substance abusers whose behavior may also be shaped by housing programs. Of 355 participants in randomized trials of CM, 56 (16%) reported using transitional housing during the 12-week treatment period. Main and interaction effects of housing status and treatment condition were evaluated for the primary substance abuse treatment outcomes: a) longest duration of abstinence from alcohol, cocaine, and opioids, b) percentage of samples submitted that were negative for these substances, and c) treatment retention. After controlling for demographic and clinical characteristics, those who accessed housing programs submitted a higher percentage of negative samples (75%) compared to those who did not access housing programs (67%). Housing status groups did not differ in terms of longest duration of abstinence (accessed housing:  $M = 3.1$  weeks,  $SE = 0.6$ ; did not access housing:  $M = 3.9$  weeks,  $SE = 0.3$ ) or retention in substance abuse treatment (accessed housing:  $M = 6.4$  weeks,  $SE = 0.6$ ; did not access housing:  $M = 6.6$  weeks,  $SE = 0.3$ ). Regardless of housing status, CM was associated with longer durations of abstinence and treatment retention. No interactive effects of housing and treatment condition were observed ( $p > .05$ ). Results suggest that those who accessed housing programs during substance abuse treatment benefit from CM to a comparable degree as their peers who did not use such programs. These effects suggest that CM remains appropriate for those accessing housing in community-based programs.

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### 1. Introduction

Housing is an important issue in substance abuse treatment. Unstable housing and homelessness are associated with greater substance use severity (Eyrich-Garg, Cacciola, Carise, Lynch, & McLellan, 2008) and higher service utilization costs (Buchholz et al., 2010), and a substantial number of those in substance abuse treatment are affected. Among a sample of 5629 treatment-seekers at 158 substance abuse treatment programs across the US, 12% were homeless and an additional 20% were marginally housed and at risk for homelessness (Eyrich-Garg et al., 2008). Several studies (Krupski, Campbell, Joesch, Lucenko, & Roy-Byrne, 2009; Milby et al., 1996, 2000; Winn et al., 2013) conclude that the provision of housing or housing assistance services to homeless substance abusers increases the propensity for them to initiate substance abuse treatment as well as improves their treatment outcomes. In particular, abstinent-contingent housing improves substance abuse treatment outcomes relative to

non-contingent housing (Milby, Schumacher, Wallace, Freedman, & Vuchinich, 2005).

The abstinent-contingent housing used in these studies (Milby et al., 1996, 2000, 2005; Tuten, DeFulio, Jones, & Stitzer, 2012) is a form of the behavioral intervention contingency management (CM), in which objective testing of alcohol and drug use occurs frequently and positive samples result in immediate removal from housing. Alcohol- and drug-free housing, including recovery, sober living, half-way, or after-care housing (e.g., Jason, Olson, Ferrari, & Lo Sasso, 2006; Polcin, Korcha, Bond, & Galloway, 2010a, 2010b), can be viewed as a milder form of abstinent-contingent housing. These alcohol- and drug-free housing programs differ in their organizational structure and governance, but all aim to provide an environment supportive of sobriety (Polcin, 2009). While use of alcohol or drugs can result in eviction, whether and to what extent alcohol and drug testing occurs varies considerably (Mericle, Miles, & Cacciola, 2015). Drug testing may range from cued (e.g., based on suspicion of intoxication) to random to regularly scheduled. Contingencies, such as eviction, can also be implemented differently, such as only as a last resort for repeated intoxications or positive samples versus for a single positive sample. As such, we might expect fewer benefits from variably applied contingencies in heterogeneous community-based housing programs compared to the

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tightly controlled evidence-based abstinence-contingent housing programs as implemented in research studies (e.g., Milby et al., 1996, 2000, 2005; Tuten et al., 2012). Despite variabilities in program policies and contingencies, substance abusers in alcohol- and drug-free housing programs appear to benefit from participating in housing programs in terms of abstinence and psychosocial improvements (e.g., Jason et al., 2006; Jason, Olson, et al., 2007; Polcin, 2009; Polcin et al., 2010a, 2010b), and a recent meta-analysis of these programs (Reif et al., 2014) found moderate benefits of recovery housing relative to usual aftercare treatment (i.e., without housing) in terms of drug and alcohol use outcomes and some psychosocial domains.

Tuten et al. (2012) investigated whether those in abstinence-contingent housing benefit from the addition of CM integrated into intensive outpatient treatment. They randomized patients who had undergone opioid detoxifications to usual care, abstinence-contingent recovery housing, or abstinence-contingent housing plus reinforcement-based intensive outpatient treatment in which access to the full range of treatment group activities (e.g., skills-building group, recreational activities) was abstinence-contingent. Those randomized to the enhanced CM group achieved the highest rates of abstinence (50%) compared to abstinence-contingent housing alone (37%) and usual care (13%). These results suggest that although abstinence-contingent housing improves treatment outcomes, the addition of CM in the context of intensive outpatient treatment can further improve outcomes.

CM interventions typically use tangible incentives as reinforcers (Higgins et al., 1994; Petry, 2000) rather than housing or access to other treatment activities. These incentives come in the form of vouchers exchangeable for goods or services or prizes such as electronics, gift certificates, or toiletries. These voucher and prize-based CM interventions for the reduction of substance use are efficacious (see meta-analyses Benishek et al., 2014; Lussier, Heil, Mongeon, Badger, & Higgins, 2006; Prendergast, Podus, Finney, Greenwell, & Roll, 2006). CM can also be used to increase other behaviors, such as treatment attendance (Branson, Barbuti, Clemmey, Herman, & Bhtuia, 2012; Fitzsimons, Tuten, Borsuk, Lookatch, & Hanks, 2015; Kidorf et al., 2013; Ledgerwood, Alessi, Hanson, Godley, & Petry, 2008), completion of treatment goal-related activities such as completing a resume or attending a medical appointment (Petry, Weinstock, Alessi, Lewis, & Dieckhaus, 2010; Petry et al., 2006), and adherence to addiction pharmacotherapies (Carroll & Rounsaville, 2007; Johansson, Berglund, & Lindgren, 2006).

CM's efficacy is well established, but questions remain about the subgroups for which this intervention may be most effective and best targeted. Substance abuse treatment patients residing in substance-free housing programs may be living under a potentially powerful contingency (access to or loss of housing) that may decrease the benefits of voucher or prize-based CM programs as delivered within substance abuse treatment settings. Tuten et al. (2012) suggest additive effects of CM are possible above and beyond contingent-housing, but that study was conducted in an experimenter-managed living setting. No studies have examined the extent to which community-based housing programs impact response to CM delivered in the context of standard psychosocial substance abuse treatment settings. In this study, we investigated whether substance abuse treatment patients who accessed community housing programs benefited from voucher or prize-based CM. These housing programs, with their variable approaches to alcohol and drug testing and implementation of contingencies, lack the systematic features of a well-designed CM program and likely leave room for additional improvements in substance abuse treatment outcomes. Based on the above literature, we anticipated that substance abuse treatment patients who accessed community housing programs during their participation in outpatient substance abuse treatment would have better substance use outcomes overall than their counterparts not using such housing settings and that they would benefit similarly from CM. If these hypotheses are supported, they would suggest that CM should be applied to patients accessing outpatient substance abuse treatment services, regardless of whether they are residing in housing programs.

## 2. Materials and methods

### 2.1. Participants

Data for these secondary analyses were collected as part of three randomized clinical trials (Petry, Alessi, Marx, Austin, & Tardif, 2005; Petry et al., 2004, 2006) examining the efficacy of contingency management interventions for reducing substance use. Across studies, the targeted population, treatment intensity and duration, assessment and outcomes measures, procedures, and clinic settings were comparable. All participants ( $N = 355$ ) were adult, English-speaking substance users initiating intensive outpatient substance abuse treatment at local community clinics who reported *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994)* cocaine abuse or dependence. Exclusion criteria across trials included: (1) severe cognitive impairment; (2) severe and uncontrolled psychiatric conditions (e.g., actively suicidal, psychotic); and (3) currently in recovery for pathological gambling. Age, education level, employment status, years of cocaine use, and proportion of those who accessed housing facilities were similar across studies ( $ps > .05$ ), suggesting that the samples were similar demographically.

Of the full sample ( $N = 393$ ) enrolled in these trials, 38 (10%) did not complete the during-treatment assessments or did not respond to the items related to housing due to experimenter error and were excluded from analyses. Excluded cases do not differ from those retained for analyses on education level, employment status, or years of cocaine use but do differ on age,  $M = 33.9$  ( $SD = 7.7$ ) versus  $M = 36.6$ , ( $SD = 7.6$ ),  $t(391) = -2.04$ ,  $p = .04$ , and hence primary analyses below controlled for age.

Sixteen percent of the sample (56 of 355) reported use of housing programs during the 12-week treatment period. Among these individuals, cumulative number of nights in housing facilities during the 12-week treatment period averaged 35.6 days ( $SD = 30.5$ ; Mode = 30; IQR = 14–60 days). Those accessing housing used 34 different programs. In an attempt to better characterize the housing programs, we calculated rough estimates of the number of participants who appeared to use homeless-focused programs (e.g., emergency shelters, transitional living) versus programs oriented toward recovery (e.g., sober houses, recovery houses, halfway houses). Of the 56 persons who reported staying in a housing program, 57% ( $n = 32$ ) appeared to access homeless-focused programs, and they had an average of 27.1 days housed ( $SD = 28.2$ ); 38% ( $n = 21$ ) seemed to have stayed in recovery-oriented services and had an average of 45.4 days housed ( $SD = 30.8$ ). Two other participants accessed both types of housing and housing type was unknown for one participant. Due to the retrospective nature of these categorizations, we consider them preliminary and not without error. Thus, owing to this limitation and the small sample size, we did not conduct more nuanced analyses by housing type.

### 2.2. Measures

Participants submitted breath samples (Intoximeters, St. Louis, MO) that were screened for alcohol and urine samples that were screened for cocaine and opioids using OnTrak TestStiks (Varian, Inc., Walnut Creek, CA). They also completed a baseline questionnaire battery that included the Addiction Severity Index (ASI; McLellan et al., 1985) and an adaptation of the Service Utilization Form (SU; Rosenheck & Lam, 1997). These questionnaires were also completed 4 weeks after starting treatment and at the end of the 12-week treatment period.

The ASI, a semi-structured clinical interview, provides composite severity scores in several domains (e.g., medical, employment, drug) over the past 30 days. Scores range 0.0–1.0, with higher scores indicating greater severity in a given domain. The SU assesses service utilization, including the number of admissions to housing services and the number of nights housed in various settings. This study focused on the use of any non-permanent housing programs, including halfway

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