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## Eighteen Month Outcomes for Clients Receiving Combined Outpatient Treatment and Sober Living Houses

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### Abstract

One of the most frequent and frustrating challenges facing clients in outpatient treatment is finding a living environment that is free of alcohol and drugs and supportive of recovery. Sober Living Houses (SLHs) have been suggested as one potential solution (Polcin, 2009). Among other advantages, SLHs are financially self-sustaining and residents can remain there as long as they wish, provided they comply with house rules and expectations. This study examined 18-month outcomes for 55 individuals receiving outpatient treatment combined with residence in a SLH. Repeated measures analyses comparing 6-month time periods showed significant improvement on measures of alcohol and drug use, arrests, and days worked. The Addiction Severity Index (ASI) showed significant improvement on legal and employment scales. On ASI alcohol and drug scales, individuals entered SLHs with very low severity that was maintained at 18 months. Involvement in 12-step groups was associated with reductions in alcohol and drug use.

### Keywords

Sober Living House; Outpatient Treatment; Recovery House; Social Model; Alcoholics Anonymous

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Over the past several decades, treatment for addiction problems in the U.S. has transitioned from services delivered primarily in inpatient or residential settings to services delivered in outpatient programs (Institute of Medicine, 1997; McLellan, 2006). While outpatient programs have the advantage of containing costs and enabling clients to continue activities (e.g., work and school) that can support recovery, there are disadvantages as well. Relapse rates are high for clients who do not live in environments that support recovery and in some cases clients live in environments that actively encourage alcohol and drug use (Howard, La Veist, & McCaughrin, 1996). For these individuals, the progress they make while attending outpatient programs can be undermined by characteristics of the social environment where they live (Polcin et al, 2004). This issue is particularly prominent in low income areas where there are higher rates of crime, heavy drinking, and illicit drug use. Studies in the U.S. have shown that publicly financed programs in urban areas treat large proportions of clients who reside in destructive living environments that do not support recovery (Howard, La Veist, & McCaughrin, 1996). In addition, treating addiction problems among homeless clients

without the provision of an alcohol and drug free living environment is especially challenging because they face constant obstacles to their health and safety as well as their sobriety (Polcin, 1999).

There is therefore a need for more alcohol and drug free housing for clients who are involved in outpatient treatment programs. After reviewing selected literature on halfway houses for addictive disorders, we introduce SLHs as a potentially more effective solution to the problems that outpatient clients have finding alcohol- and drug-free places to live. We then report on outcomes for 55 SLH residents over an 18 month period.

## Selected Research on Halfway Houses

Research has shown that when clients do receive housing as part of treatment there is evidence that it is beneficial. For example, Hitchcock, Stainback and Roque (1995) found that provision of halfway house living arrangements while clients attended outpatient treatment resulted in better retention and achievement of treatment milestones than clients who made their own living arrangements in the community. Milby et al (2005) reported similar findings. They studied whether the provision of abstinent contingent housing during outpatient treatment was more effective than no provision of housing or housing that did not require sobriety. Although all three groups made improvement on outcome measures, the abstinent contingent housing group improved the most. Thus, there is an urgent need to address housing problems for clients in outpatient treatment.

Although halfway house models are effective, there are several inherent limitations. As we have reviewed in previous papers (i.e., Polcin & Henderson, 2008; Polcin, 2009), the first is that they are time limited. Rather than clients having the choice to leave when they feel sufficiently stable and confident about alternative living arrangements, they are forced to leave within a predetermined time frame developed by the program. A second concern is funding. Many halfway house programs rely on state or local funding, which makes the houses vulnerable to budget cuts. In addition, because they are not financially sustained through resident fees and it is primarily program staff who manage the facilities, there can be a limited sense of resident ownership and empowerment (Polcin, 2009).

## Sober Living Houses

A model of housing known as “Sober Living Houses” (SLHs) addresses these concerns. As reviewed elsewhere (i.e., Polcin & Henderson, 2008), SLHs are alcohol and drug free living environments for individuals attempting to establish or maintain abstinence from drugs and alcohol. They typically do not offer any formal treatment services, but encourage or require attendance at self-help groups such as Alcoholics Anonymous. One of the advantages of SLHs is that residents are free to stay as long as they like. A second advantage is that they are financed through resident fees, which inoculates them from state and local budget cuts. Some houses are sufficiently inexpensive to accommodate residents who are on General Assistance or Social Security Disability Income (Polcin, 2009). However, others are more expensive and serve primarily individuals who work full time or have access to other financial resources, such as support from their families. Because they are financially self-sustaining and efforts are made to involve residents in management of the houses, a sense of resident empowerment and commitment is generated.

Most SLHs operate as freestanding programs and have no affiliation with specific treatment programs, although residents may be attending various outside substance abuse, mental health, and other services in the community (Polcin & Korcha, 2006). However, there is no inherent reason why SLHs cannot be affiliated with specific programs, similar to halfway or aftercare houses offered by some treatment programs (Polcin, 2009).

## Options Recovery Services

Options Recovery Services (ORS) is an outpatient program located in Berkeley, California that offers services to a variety of clients suffering from addictive disorders. A unique aspect of the program is the provision of SLHs for a limited number of clients. ORS treats about 800 clients per year, primarily individuals who are low income. Structured into 3 phases, the program offers a variety of recovery services including intensive case management, recovery groups, and aftercare. When clients begin the program they are required to attend ORS 5 days per week and attend daily 12-step groups. As clients progress through the phases of treatment there are fewer requirements and increased flexibility. However, throughout all phases of treatment clients are expected to be attending 12-step meetings and working a 12-step program of recovery (Polcin, 2009).

In response to the large number of clients in the outpatient program who were homeless or lacked stable housing, ORS developed SLHs where clients could reside while they attended the outpatient program. Although most SLHs are freestanding programs not affiliated with any formal treatment (Polcin & Henderson, 2008), there is no inherent reason why they can't be associated with formal services (Polcin, 2009). Unlike most halfway houses, the SLHs were designed so that residents could remain in the houses after completing the outpatient program and continue their residency as long as they wished provided they complied with house rules. ORS currently has 4 houses with 58 beds. Most residents are eligible for some type of government economic assistance and they use that assistance to meet expenses at the SLHs. The agency adjusts fees based on amount of income. For those on General Assistance (GA), the fees are \$250 per month and for those on Social Security Insurance (SSI) the fees are \$350 per month (Polcin, 2009).

The SLHs at ORS are structured in a way that encourages resident involvement. A "senior resident" who generally has a substantial time in recovery and who has lived in the SLH longer than other residents is designated a house manager. This individual is responsible for making sure house rules are followed and consequences for rule violations are carried out. In addition, the house manager monitors the physical site for health and safety and reports needed repairs or changes to the ORS executive director. Mandatory house meetings are held each week that focus on resident responsibilities, such as rotation of household chores, resident responsibilities, and enforcement of house rules. Residents have some input into development and enforcement of house rules and policies during house meetings, but policy is primarily developed by the agency's executive directors in consultation with house managers. House rules and expectations include things like a curfew, no smoking, and abstinence from alcohol and drugs. Relapse is grounds for eviction from the house but is usually handled by referring the individual to a more intensive, residential treatment (Polcin, 2009).

## Previous Studies on Sober Living Houses

While studies on SLHs have been limited, there have been three reports, one on freestanding SLHs (Polcin & Henderson, 2008), one on SLHs affiliated with outpatient treatment (Polcin, 2009) and one examining longer term outcomes in both types of houses (Polcin et al, in press). In a study of 211 individuals interviewed within one week of entering freestanding SLHs Polcin and Henderson (2008) found that residents were referred from a variety sources. The most common referral source was the criminal justice system (25%), followed by family/friend (23%), self (20%) and inpatient/residential treatment (13%). Regardless of referral source, residents showed improvement at 6 month follow up in a variety of areas, including substance use, work, arrests and psychiatric symptoms. Consistent with the sober

living philosophy of peer support for recovery, higher involvement in 12-step groups such as Alcoholics Anonymous was associated with better outcome.

In a study assessing 55 individuals residing at ORS SLHs (i.e. houses affiliated with outpatient treatment) Polcin (2009) found residents made improvements in the number of months of abstinence, maximum number of days of substance use per month, and number of arrests. In addition, retention in the houses was excellent, with 76% residing in the houses at least 5 months.

A more recent analysis looked at both freestanding and the ORS houses associated with treatment (i.e., Polcin, et al., in press). Although direct comparisons between the two models were not conducted, longitudinal outcomes of residents in both types of houses showed similar improvements at 12 months. On primary outcomes measuring alcohol and drug problems the patterns were the same. Residents in both types of houses either entered with high severity that improved at 6 months and was maintained at 12 months, or they entered the houses with low severity that was maintained at 12 months (Polcin et al., in press).

## Purpose

The purpose of the analyses reported here is to build on the previous findings by examining outcomes for the same sample of ORS residents in SLHs at 18 months and examining a variety of theoretically relevant covariates of outcome (e.g., 12-step involvement and social support for abstinence). Our primary interest was to assess outcomes that measure the severity of drug and alcohol problems. We expected that residents who entered with higher severity of drug and alcohol problems would show significant improvement. For residents entering with low severity of alcohol and drug problems we expected low severity to be maintained at 18 month follow up. Secondary outcomes included measures of employment, psychiatric, legal, medical, and family problems. Because social support for abstinence and involvement in 12-step groups are central to the recovery philosophy of SLHs, we expected these factors to correlate with better outcome.

## Methods

### Sample

Study participants consisted of 55 individuals entering 4 different SLHs that were operated by Options Recovery Services. Table 1 depicts demographic characteristics. Nearly all the participants were male due to the closing of the only women's house shortly after the study began. The racial distribution was African American (59%), white (30%), and other (11%). The mean age was 43 years ( $se=1.2$ ). Most residents had completed high school or a GED (73%). Nearly half of the residents had been self referred or referred by family or friends. About 24% were criminal justice referrals and a third had spent some time in a controlled environment during the month before entering the house. Many of the residents had histories of homelessness. When asked to indicate their usual housing situation the past six months, a third indicated homeless or in a shelter. During the year before entering the program, the most common substances residents were dependent on were cocaine (60%) and alcohol (55%) (not shown in the table). Other dependencies were less common: cannabis (18%), heroin (15%), and amphetamines (12%). For a more complete description of the sample and the SLHs see Polcin (2009).

### Procedures

All study participants were interviewed during their first week of entering the houses between January 2004 and July 2006 and interviewed again at 6-, 12-, and 18-months. Interviews required about 2 hours and participants were paid \$30 for the baseline interview

and \$50 for each of the follow up interviews. All participants signed an informed consent to take part in the study and all were informed that their responses were confidential. Study procedures were approved by the Public Health Institute Institutional Review Board and a federal certificate of confidentiality was obtained, adding further protection to confidentiality.

To reach individuals for follow up interviews we required them to provide contact information (e.g., phone number, address, e-mail, names of friends who might know their whereabouts, family members' phone numbers, health service professions from whom they received services, shelters they frequented, and criminal justice personnel). Follow up rates for were 86% at 6 months, 76% at 12 months and 71% at 18 months. As described below, we used generalized estimating equations (GEE) for our analyses, which enabled all participants to be included in analyses even if they missed follow up interviews.

## Measures

- 1) *Demographic Characteristics* included standard demographic questions such as age, gender, ethnicity, marital status, and education. Demographic characteristics were used to describe the sample and were also used as covariates in GEE analyses to assess whether they predicted outcome.
- 2) *DSM IV Checklist for Past 12 Month Alcohol and Drug Dependence* was used to assess substance use disorders over the past 12 months. Items are based on DSM IV diagnostic criteria (American Psychiatric Association, 2000; Forman, Svikis, Montoya & Blaine, 2004). This measure was administered at baseline only to describe substance dependencies among the sample.
- 3) *Addiction Severity Index Lite (ASI)*: The ASI is a standardized, structured interview that assesses problem severity in six areas: medical, employment/support, drug/alcohol, legal, family/social and psychological. The ASI measures a 30 day time period and provides composite scores between 0 and 1 for each problem area. The ASI has demonstrated good reliability and validity in numerous studies (McLellan et al., 1992). Although the instrument includes a measure of psychiatric severity as well, we opted to use the more comprehensive Brief Symptom Inventory, which is described below. ASI alcohol and drug scales were used as primary outcomes and the other ASI scales (i.e., medical, family, legal and vocational) were used as secondary outcomes.
- 2) *Psychiatric symptoms*: To assess current psychiatric severity we used the Brief Symptom Inventory (Derogatis & Melisaratos, 1983). This 53-item measure assesses severity of psychiatric symptoms on nine clinical scales as well as three global indices. Items are rated on a 5-point scale and ask about symptoms over the past 7 days. We used the Global Severity Index as an overall measure of psychiatric severity, on of our secondary outcome variables.
- 3) *Six month measures of alcohol and drug use*: These measures were taken from Gerstein et al. (1994) and labeled Peak Density and 6-month abstinence. *Peak Density* was the number of days of any substance use (i.e., any alcohol or drug) during the month of highest use over the past 6 months. *Six-month abstinence* was a dichotomous yes/no regarding any use of alcohol of drugs over the past 6 months. These measures were used as primary outcome variables.
- 4) *Additional 6-month Variables*: Two additional measures were taken from Gerstein et al. (1994). These included measures of *arrests* and *days worked* over the past 6 months. Both were used as secondary outcome variables.

- 5) *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. The scale includes a number of items beyond attendance at meetings, including questions about sponsorship, spirituality, and volunteer service positions at meetings. An overall scale score ranging from 0 – 9 is generated by summing the items. Measures of internal consistency have been shown to be good across a variety of groups. 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.
- 6) *Drinking and drug use status in the social network*: These measures were taken from 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 (e.g., spouse, friend), amount of contact over the past 6 months (e.g., daily, once or twice a week) and drug and alcohol use over the past 6 months (e.g., heavy user, light user, in recovery) 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

Our primary interest was to determine if outcome measures improved between baseline and 6 months and if areas of improvement were maintained at 12 and 18 months. On variables where residents entered with low problem severity, we were interested to see if problems increased over time. To assess longitudinal changes for each of our outcome measures (ASI scales, GSI, Peak Density, abstinence and arrests) we used Generalized Estimating Equation (GEE) models (Diggle, Heagerty, Liang & Zeger, 2002) that compared each follow up time point (i.e., 6, 12 and 18 months) with baseline. Each outcome measure was entered into a separate model controlling for a variety of baseline demographic covariates (i.e., age, race, education, marital status and gender).

We developed additional GEE models to assess whether factors that are central to the recovery philosophy of SLHs (i.e., involvement in 12-step groups and establishing a social network supportive of abstinence) were related to outcome. A key advantage of GEE models is that resulting coefficients and odds ratios allow a longitudinal interpretation of within-individual change in the outcome over time and how those changes are associated with covariates of interest. We used separate models examined how the 12-step involvement, drinking status of the social network and drug use status of the social network predicted improvement in outcome variables over time. Models controlled for demographic characteristics and time of the interview. Because most of our outcome measures were continuous (ASI, GSI, and Peak Density) most outcomes are reported as coefficients and standard errors. Those that are dichotomous (abstinent versus not and arrested versus not) are reported as odds ratios.

## Results

### Baseline Characteristics

In addition to demographic characteristics, Table 1 shows resident functioning on outcome variables at the baseline time point. Residents entered the SLHs with relatively low ASI

alcohol (mean=0.07, se=0.02), drug (mean= 0.05, se=0.01), and legal (mean=0.09, se=0.02) severity. Other outcome measures at baseline were of moderate to high severity, which included other ASI scales (family, medical and employment) and the GSI (psychiatric symptoms). Measures that assessed the previous 6 months before residents entered the SLH revealed more extensive substance use. For example the average Peak Density of substance use over the 6-month period prior to entering the house was 19.3 (se=1.7) days of substance use per month and only 11% had been abstinent for the entire 6-month period. In addition, involvement in the criminal justice system was common, with about 40% reporting an arrest during the past 6 months.

### Longitudinal Outcomes

GEE analyses were used to assess how outcome measures at 6-, 12- and 18-month follow up compared to baseline. For outcome variables measuring a 6 month period of time, there was a consistent longitudinal pattern (see Table 2). Between baseline and 6 months nearly all of these variables showed significant improvement. At 12 and 18 months we found that most of these improvements persisted. This was the pattern for abstinence over the past 6 month, Peak Density, and arrests. For number of days worked we found we found significant improvement relative to baseline at 12 and 18 months, but not at 6 months. In addition, the magnitude of these improvements was large. For example, relative to baseline, residents at 6 months were 16 and one-half times likely to report being abstinent. By 18 months the odds ratio dropped to 6.5, but was still highly significant.

Variables that measured shorter lengths of time generally had a different pattern. For example, residents entered the SLHs with relatively low ASI alcohol and drug scale scores that were maintained at follow up time points. The mean for alcohol severity at baseline was 0.07(se=0.02). That remained essentially the same at 6 months (mean=0.06, se=0.02) and 12 months (mean=0.5, se=0.02) and increased only slightly at 18 months (mean=0.11, se=0.03). We found the same pattern for drug severity. At baseline, residents entered with a mean of 0.05(se=0.01). At 6 months, drug severity was similar (mean=.03, se=0.01) and remained about the same at 12 months (mean=0.05, se=0.2). At 18 months drug severity increased only slightly (mean=0.11, se=0.3).

It is important to note that residents were able to retain their improvements even after leaving the SLH. Among the resident contacted for follow up interviews 71% had left the residence 12 months and by 86% had left at 18 months. However, we found little in terms of exacerbation of problems at these time points.

On other ASI variables, we saw residents enter with relatively higher severity that did not improve. This was the case for ASI Family and medical severity, as well as psychiatric symptoms on the BSI. (See Table 1 for baseline values for these variables).

### Predictors of Outcome

In general, we found very few demographic predictors of outcome and no consistent patterns in terms of any subgroups having better outcomes over time. Some variables that did not improve over time nonetheless had significant covariates. These included the ASI alcohol, ASI medical and Global Severity scales on the BSI. ASI alcohol severity was lower for residents with at least a high school education (coefficient=-0.06, se=0.03, p<.05). Higher education was also associated with lower psychiatric severity on the BSI (coefficient=-0.32, se=0.16, p<.05). Older age was associated with higher psychiatric (coefficient=0.35, se=0.13, p<.01) and medical severity (coefficient=0.12, se=0.05, p<.05).

Table 3 shows how three variables that are theoretically related to the recovery philosophy in SLHs (i.e., 12-step involvement, drinking in the social network and drug use in the social

network) predicted outcomes that improved over time. As expected, level of involvement in 12-step groups was a strong predictor of outcome, particularly on the primary outcome variables measuring a 6 month period of time. Residents with a higher level of involvement in 12-step groups were 25% more likely to be abstinent. Twelve-step involvement was also a predictor of Peak Density (coefficient=-1.27, se=0.42) and ASI legal severity (coefficient=-0.01, se=0.01). A statistical trend was noted for 12-step involvement predicting number of arrests during the past 6 months (OR=0.79, p=0.07).

Twelve step involvement was also associated with better outcomes on several variables that did not show significant longitudinal improvement, including ASI drug (coefficient = -0.01, se=0.01, p< .05) and legal (coefficient = -0.01, se=0.01, p< .05) severity. However, it did not predict any other primary or secondary outcomes (e.g., ASI alcohol severity, ASI employment severity, and days of work).

We also expected that alcohol and drug use in the social network would predict outcome. We found this confirmed for Peak Density and days worked, but not for most other variables. (See Table 3 for coefficients and standard errors). Peak Density was predicted by both alcohol and drug use in the social network and days worked was predicted by drug use. The only other outcome variable predicted by substance use in the social network was drug use predicting ASI alcohol severity (coefficient=0.06, se=0.02, p<.01) (not shown in the table).

## Discussion

A relatively new development in addiction services is to provide residence in sober living houses while clients attend outpatient treatment. To the best of our knowledge, our study represents the first long term follow up of individuals receiving these services. Overall, our findings provide important descriptive support for this combination of services.

### Primary Outcomes

Findings on our primary outcome variables assessing alcohol and drug problems confirmed our hypotheses. We expected that residents who entered the SLHs with high severity would show significant improvement at 6 months and that the improvement would be maintained at 12 and 18 months. For residents who entered the houses with low severity at baseline, we expected low severity to be maintained at all subsequent time points. Not surprising, we found variables measuring a 6 month period of time to be high at baseline, whereas variables measuring a shorter time period (e.g. the ASI scales, which measure 30 days) to be lower in severity. In general, the SLHs required that prospective residents have 30 days of abstinence from alcohol and drugs and be in good standing in the outpatient treatment program before they are eligible to enter the SLHs. Thus, it is not surprising that measures assessing that time period would reflect low severity. If severity were high at that time point they would not have been eligible for entry. However, the critical question here was whether low severity could be maintained over time. Our analyses confirmed that there was no significant increase in severity of alcohol or drug problems on the ASI up to 18 months.

It was also not surprising that when we examined substance use during the 6 months before residents entered the SLHs (abstinence and peak density variables), we found higher severity. This period of time of course included 5 months during which residents were not obligated to be abstinent or be attending the outpatient program. Because residents entered the SLHs with higher severity on these variables there were opportunities to improve on them, which is what we found. More importantly, improvements were maintained at 12 and 18 months, even though two-thirds had left the SLH by 12 months.



## Secondary Outcomes

Results on secondary outcome measures were similar to the primary outcomes in that variables measuring a 6 month time period showed significant improvement over time. At baseline about 40% had been arrested during the past 6 months. The odds of being arrested between baseline and 6 months went down by over a fifth. It was interesting that the odds of being arrested continued to decrease at 12 and 18 months even though larger proportions were no longer residing at the SLH. Thus, the improvement does not appear to be solely a function of residing in the SLH.

Improvement in days worked followed a different pattern. Here, there was no significant difference in number of days worked over the past 6 months between baseline and 6 months. However, we did find improvement at 12 and 18 months. One reason for this finding is that the program discourages residents from seeking work during the first few months of treatment. The program takes the position that working on one's recovery should take precedence during the early months of treatment and employment should be postponed until after the resident settles into several months of sustained recovery.

Despite the program's emphasis on not working during the early months of treatment, we nevertheless found significant improvement at 6 months on the ASI employment scale. One reason why ASI employment may have improved while days worked did not is that the ASI employment scale includes items that measure things like involvement in school and vocational training and obtaining a state identification card. The program does not discourage residents from enrolling in school or training programs early in treatment. Like number of days employed, ASI employment at 12 and 18 months continued to improve relative to 6 months.

The only other ASI scale showing significant improvement was the legal scale. Like number of arrests, legal problems improved from baseline to 6 months, and those improvements were maintained at 12 months. Although the 18 month finding was no longer statistically significant, it nevertheless continued as a statistical trend in the expected direction. The improvements were particularly noteworthy because they occurred despite the fact that individuals entering the SLHs had relatively low severity on the legal scale. By the time study participants were entering the SLHs they had typically been abstinent for a month and in good standing in the outpatient program. For most residents, it was probably the case that their legal problems would be resolved if they continued the program of recovery they had begun. Thus, they were not overly concerned about their legal status at the time they entered the houses.

Three areas where residents entered the SLHs with moderate to high severity that did not improve were medical, psychiatric and family problems. We expected that improvement in alcohol and drug problems would also result in improvement in these coexisting areas. Understanding why we did not find this requires further investigation. However, one potential factor might be that problems in these areas might reflect chronic conditions that are not easily improved. For example, some residents had medical problems with a chronic course, such as HIV and hepatitis. Others had unremitting psychiatric conditions such as recurring anxiety, depression and psychotic disorders. In terms of family relationships, some residents were estranged from family and continued to have no or limited contact even after entering the houses. Thus, there may have been limited opportunities for improvement.

It is worth noting that residents on average made large improvements in terms of alcohol and drug use and other areas despite the ongoing presence of these coexisting problems. While lack of improvement on psychiatric, medical and family problems suggests that the program

should do all that it can to increase services to address them, it is also a tribute to the gains that residents were able to make despite the persistence of these problems.

### Correlates of Outcome

Overall, our primary and secondary outcomes did not vary by demographic characteristics such as such as age, race and education. Thus, the aforementioned improvements that we found might be generalized to various demographic groups. However, one caveat is that our N of 55 was relatively low in terms of statistical power and a larger sample might have found differences not tapped here.

Consistent with the philosophy of recovery used in the combined outpatient treatment and SLH residency was our finding that social support characteristics were associated with some outcomes. Involvement in 12-step groups was the strongest predictor of outcome. More involvement in 12 step groups over the past 6 months was associated with a higher likelihood of being abstinent, lower Peak Density, and lower ASI legal severity. However, 12-step involvement did not predict other ASI outcomes, including alcohol and drug severity. Part of the reason may be that our measure of 12-step involvement assessed a 6 month period of time, whereas the ASI only assesses the past 30 days. The 5 months that factor into the 12-step involvement scale but not the ASI Alcohol and Drug scales could be a source of “noise” that detracted from our ability to find associations. This difference in time periods assessed was not an issue for our other primary outcomes, abstinence and Peak Density, both of which measured a 6 month time period. Also, residents entered with low ASI alcohol and drug severity that changed minimally over time. Lack of variation on these variables might have added to the difficulty finding associations.

In addition to involvement in 12-step groups, we also expected that social networks that were supportive of abstinence would be associated with outcome variables over time. Like involvement in 12-step groups, developing social support for sobriety is a critical component of the recovery philosophy of SLHs. However, the results were mixed. We found that our measures of drinking and drug use within the social network were predictive of Peak Density but not abstinence. The only other outcome variable predicted by substance use in the social network was drug use status predicting number of days worked over the past 6 months. One factor that might have played a role in the lack of association found is the limited variability on these measures. For example when we examined whether individuals had heavy drinkers or drug users in their social networks we found the 80% or more reported no heavy drinkers and no heavy drug users. This occurred across all time points for both drinking and drug use. It should be pointed out that participants were asked about “important people” in their social networks. By the time they were entering the SLHs (baseline) they may have been have cut ties to individuals who were actively using and therefore did not identify them as “important people” in the social network.

### Limitations

There are several limitations to the study that are important to consider. First, although we conducted longitudinal comparison of resident functioning over time, we did not compare outcomes of SLH residents with individuals residing in other living situations. Because there was no comparison group, we cannot necessarily conclude that SLHs caused the improvements. Individuals self selected themselves into the SLHs and the characteristics of these individuals may have at least in part accounted for the longitudinal improvements. A second limitation is that the context of the study was in the U.S., where abstinence oriented treatments are common. The SLH approach to recovery would not be appropriate for individuals interested in harm reduction and it might need to be modified if used in other countries or cultural contexts.

## Conclusion

The lack of a living environment that supports sustained recovery is a major obstacle to successful treatment of substance use disorders in outpatient programs. Although SLHs have traditionally been independent of formal treatment, ORS developed SLHs that provide support for recovery while clients attend their outpatient treatment program and after they complete treatment. The houses are financially self sustaining and geared to be affordable to the clients most in need of stable housing, such as those who at low economic levels, on General Assistance, or previously homeless. Unlike traditional halfway houses, there is no predetermined maximum length of stay, so the residents themselves can decide when they are ready to leave.

In our study of 55 residents we found two patterns of outcome over 18 months: 1) On instruments that measured a 6-month period of time we found significant improvement between baseline and 6 months and those improvements were maintained at 12 and 18 months. These included measures of alcohol and drug use, arrests and days worked. We found similar patterns for ASI legal and employment scales. 2) On ASI alcohol and drug scales we found residents entered the houses with low severity that was continued at all subsequent time points. When we examined predictors of outcome we found that higher level of involvement in 12-step groups predicted better outcome.

There is a need for studies with larger samples that are better controlled (e.g., random assignment to comparison conditions). However, based on the promising findings here, SLHs should be considered as an adjunct to outpatient treatment for clients who have access to limited financial resources or reside in destructive living environments.

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**Table 1**

## Baseline characteristics

	N=55
<b>Demographics</b>	<b>%</b>
Male	94
Never Married	46
Children under 18	44
White/Caucasian	30
GED/High School Education	73
Controlled Environment (past 30days)	33
Referral source	
Criminal	24
Inpatient	4
Self / Family / Friend	46
Other	27
Continuous Measures	mean (S.E.)
Age	43(1.2)
Income from all sources	\$447 (55)
Length of stay (# days)	254(24)
ASI Alcohol	0.07(0.02)
ASI Drug	0.05(0.01)
ASI Medical	0.36(0.54)
ASI Legal	0.09(0.02)
ASI employment	0.86(0.03)
ASI family	0.25(0.02)
Global Severity Index (GSI)	0.67(0.08)
Peak Density	19.3(1.7)
Dichotomous Measures	%
Arrested past 6 months	40
Employed past 6 months	44
Abstinent from Alcohol and Drugs past 6 months	11

**Table 2**

Outcomes over time using generalized estimating equation (GEE) models

Demographic	Continuous Measures			Dichotomous Measures		
	Days Worked	ASI Legal	ASI Employment	Peak density	Abstinence	Arrests
	Coef (s.e.)	Coef (s.e.)	Coef (s.e.)	Coef. (s.e.)	OR <sub>adj</sub> (95% CI)	OR <sub>adj</sub> (95% CI)
Interview						
Baseline (ref)	---	---	---	---	---	---
6-month	7.98(8.27)	-0.04(0.02) <sup>a</sup>	-0.10(0.03) <sup>c</sup>	-15.54(1.75) <sup>c</sup>	16.45(6.61-40.90) <sup>c</sup>	0.17(0.06-0.49) <sup>b</sup>
12-month	31.31(8.66) <sup>c</sup>	-0.06(0.02) <sup>a</sup>	-0.16(0.03) <sup>c</sup>	-15.54(1.85) <sup>c</sup>	15.05(5.88-38.50) <sup>c</sup>	0.04(0.01-0.28) <sup>b</sup>
18-month	39.14(8.65) <sup>c</sup>	-0.04(0.02)	-0.17(0.03) <sup>c</sup>	-10.71(1.84) <sup>c</sup>	6.52(2.60-16.44) <sup>c</sup>	0.12(0.03-0.44) <sup>b</sup>

Note: Days Worked, Peak Density, Abstinence and Arrests assess the past 6 months. ASI variables measure past 30 days. Analyses controlled for age, race, and education.

<sup>a</sup> p<.05;

<sup>b</sup> p<.01;

<sup>c</sup> p<.001

**Table 3**  
Covariates predicting outcome measures using generalized estimating equation (GEE) models

	Days Worked	ASI Legal	Peak density	Abstinence
	Coef (S.E)	Coef (S.E)	Coef. (S.E)	OR <sub>adj</sub> (95% CI)
12-step involvement scale	ns	-0.01(0.01) <sup>a</sup>	-1.27(0.42) <sup>b</sup>	1.25(1.02-1.54) <sup>a</sup>
Drinking status of social network	ns	ns	3.10(1.57) <sup>a</sup>	ns
Drug status of social network	-22.65(7.62) <sup>b</sup>	ns	4.71(1.60) <sup>b</sup>	ns

Note: Coefficients and odds ratios have been adjusted for time of interview, age, race, and education.

Days Worked, Peak Density, Abstinence and Arrests assess the past 6 months. ASI variables measure past 30 days.

<sup>a</sup> p<.05;

<sup>b</sup> p<.01;

<sup>c</sup> p<.001