

REPORT OF FINDINGS FROM A SYSTEMATIC REVIEW OF THE
SCIENTIFIC LITERATURE ON
RECOVERY SUPPORT SERVICES IN THE UNITED STATES

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August 2017

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1. Introduction

Substance use disorder (SUD) is one of the most pervasive and intransigent clinical and public health challenges facing the United States (Office of the Surgeon General, 2016). While many who meet criteria for SUD are able to achieve remission without formal treatment (Cunningham et al, 2002; Kelly et al, 2017), many millions of affected individuals typically require some combination of acute care medical stabilization and long-term recovery management and recovery support services (RSS) - akin to the care of other chronic health conditions, such as diabetes and hypertension (McLellan et al, 2000) – to sustain remission. While models of long-term care and SUD RSS have emerged and grown, the state of the science in this vital sector of health care and RSS is currently unknown. This report describes the rationale for, and summarizes the scientific evidence on, a variety of emerging and established RSS intended to aid stabilization and ongoing remission and recovery from these highly prevalent disorders. As a result of this rigorous review, a new research agenda is produced to further enhance the nation's knowledge regarding the clinical and public health utility of RSS in addressing these often chronic and debilitating health conditions.

In the first section (*A Brief Rationale for Recovery Support Services in addressing Substance Use Disorder*), we provide a brief overview of the nature of SUD from neurobiological, biological, and psycho-social perspectives, which in turn, forms the medical rationale for the need for these continuing care and recovery support services following acute stabilization and treatment. In the second section (*Method*) we present the methods for this systematic review of the scientific literature. In the third section, (*A Summary of the Evidence for Recovery Support Services*) we provide a brief description of, and detailed summary of the results from empirical studies for, the six main types of RSS that are available and growing across the United States. These include: 1. Peer-based recovery support services (P-BRSS); 2. Recovery community centers (RCCs); 3. Recovery supports in educational settings; 4. Mutual-help organizations (MHOs); 5. Recovery housing (e.g., Oxford Houses); and, 6. Clinical models of continuing care and long-term recovery management.

1.1. A Brief Rationale for Recovery Support Services in addressing Substance Use Disorder

The negative impact of chronic, heavy, alcohol and other drug use on the brain and nervous system as well as its psychosocial consequences is well documented. Chronic administration of psychoactive intoxicants produces increasingly deleterious changes in the structure and function of the human brain that creates impairments in the neurocircuits of reward, memory, motivation, impulse control, and judgement. The degree of physical insult is correlated with age of onset of substance use (early exposure is worse), as well as the intensity and chronicity of exposure. At the heart of SUD is an increasing cognitive impairment in the ability of affected individuals to successfully regulate the impulse to use a substance despite suffering severe consequences resulting from its use. With treatment and support, people are able to stop substance use, but remain susceptible to a recurrence of the disorder in the early months and years of remission. Even after sustained remission is achieved, for example, it can take an additional 4-5 years before the risk of meeting criteria for SUD in the next year drops below 15% (the annual risk for SUD in the general population; White, 2012). This is because it can take considerable time for reparative work to

take place in the central nervous system. Also, the brain-based impairments are coupled with broader neuroendocrine shifts that increase sensitivity to stress in the months and years after substance use has stopped. The hypothalamic-pituitary-adrenal (HPA) axis and glucocorticoids, such as cortisol, and corticotropin releasing hormone (CRH), are higher among individuals in early recovery and can interfere with new skill learning, increasing the risk from a stress-induced pathway to relapse (Kelly & Hoepfner, 2014; Stephens & Wand, 2012). In addition, re-exposure to certain places, people, times of day/days of the week, or mood states, that have become powerfully connected to substance use through the process of classical conditioning, can serve to increase craving and risk of re-engagement with substance use. Consequently, similar to other chronic conditions, serious SUD often requires ongoing monitoring and recovery management to support continued remission and to provide early re-intervention should reinstatement of the disorder occur (Kelly and White, 2011; Dennis and Scott, 2007). This observation is one of the principle reasons why ongoing RSS are recommended following medical stabilization and short-term care. Furthermore, from a psychosocial standpoint, the abnormally high priority that substances have taken in affected individuals' lives often creates deficits in educational attainment, employment skills, and social relationships as well as criminal records; all this can leave individuals isolated from family and friends, unable to access safe housing, and at a disadvantage in terms of viable job skills and the achievement of other important developmental milestones. These deficits in recovery resources, often referred to as "recovery capital" (Granfield & Cloud, 1999, 2004), in turn can create hopelessness, decreasing resolve and ability to tolerate and meet the demands and challenges of early recovery.

The variety of established and emerging RSS are intended to provide or facilitate increases in "recovery capital" which can be drawn upon to initiate and sustain recovery over the long-term (Granfield & Cloud, 1999, 2004; Kelly and Hoepfner, 2014). Greater availability and accrual of recovery capital influences resilience and coping, and helps buffer and reduce stress, including serum CRH/cortisol levels, supporting continued remission (Kelly and Hoepfner, 2014). Indeed, RSS provide all four types of support including emotional support (e.g., compassion, empathy), tangible support (e.g., linkages to jobs, housing), informational support (e.g., advice), and social support (e.g., sense of belonging) all of which can reduce stress and build resilience, optimism, and hope.

Like older RSS, such as Alcoholics Anonymous (AA), many newer emerging RSS, such as Recovery Community Centers and Recovery Housing have emerged not from medical science, but from a recognized need among sufferers themselves. Although the establishment and growth of these recovery support resources is one kind of evidence in and of itself, more systematic quantification of the magnitude of the potential public health impact of these RSS is lacking. From a broad societal perspective, the availability of such estimates are important for national policy makers and administrators as they can inform decisions related to the potential added public health value that could be gained by supporting and facilitating expansion of various RSS. To this end, this review systematically examines and summarizes the findings from the available published scientific literature on six of the most prominent RSS: 1. Peer-based recovery support services (P-BRSS); 2. Recovery community centers (RCCs); 3. Recovery supports in educational settings; 4. mutual-help organizations (MHOs); 5. Recovery housing (e.g., Oxford Houses); 6. Clinical models of continuing care and long-term recovery management.

2. Method

2.1. Inclusion Criteria

Included studies in this review of RSS were randomized controlled trials (RCTs), quasi-experimental studies, and other research and evaluation designs that include a comparison condition (e.g., waitlist controls). If no, or insufficient numbers of, studies were found in the systematic search at this top-tier level of scientific rigor, the review summarizes the next tier of available rigorous scientific evidence; namely, single-group prospective studies or single-group retrospective studies; failing the availability of this level of evidence, a review and summary of cross-sectional/descriptive and qualitative studies was conducted. All age ranges, substances of misuse, and available outcomes were included (see 2.3. Outcomes below).

2.2. Procedure

Searches were conducted in relevant medical, psychological, and public health databases pertaining to scientific research (Pubmed, CINAHL, Central, EMBASE, and PsycInfo). Search term syntax was created specifically for each RSS and run in each database (see Appendix A for specific search syntax used for each RSS). As detailed more explicitly in each RSS research review sub-section below, searches from each database were combined, then extracted articles were compared and duplicates removed. The remaining articles were then reviewed for their design and methods according to the inclusion criteria. Articles that met criteria were then abstracted and tabularized summarizing 1. Study year 2. Study design 3. Intervention(s) 4. Sample size and nature of sample; 4. Follow-up length. 5. Participant retention rate. 6. Primary substance 7. Substance use and related outcomes (table 1), and then summarized and appraised in narrative form (see Section 3.).

2.3. Outcomes

The main outcomes described where available were alcohol and other drug use frequency (e.g., percentage of days abstinent; drinks per drinking day), proportion of individuals who are continuously abstinent, average longest period of abstinence, proportion of individuals in SUD remission (early and sustained), cost-effectiveness/health care cost-offsets, employment, criminal justice involvement, psychological well-being (e.g., happiness, self-esteem), quality of life, and measures of recovery capital. Whenever possible we compared the relative effectiveness of different models of recovery supports within and across each domain including relative cost-effectiveness.

3. A Summary of the Evidence for Recovery Support Services

We begin each section below with a brief description of the origin, nature, scope and purpose, and prevalence of each RSS. This is followed by a brief description of the search syntax and search results (see Appendix A for full search syntax) and a detailed review of the available research evidence pertaining to each specific RSS. We also provide a table that contains abstracted details as described in section 2.2 above (table 1). This is followed in each case by a brief summary of the quality of the existing research, future research needs, and implications for the addiction and recovery field. The six RSS appear below in the following order: 1. Peer-based recovery support services; 2. Recovery community centers; 3. Recovery supports in educational settings; 4. Mutual-help organizations; 5. Recovery housing; 6. Clinical models of continuing care and long-term recovery management.

3.1. Peer Based Recovery Support Services (P-BRSS)

3.1.1 Nature, scope, origin, and prevalence of P-BRSS

First arising in the 1990s, P-BRSS for people with SUD were born out of a long tradition of 12-step based mutual-support groups. P-BRSS are peer-driven mentoring, education, and support ministrations delivered by individuals who, as a result of their own experience with SUD and SUD recovery, are experientially qualified to support peers with SUD and commonly co-occurring mental disorders. P-BRSS represent a new category of specialized resources that are not treatment and not purely mutual aid, which link and supplement traditional addiction treatment and mutual aid recovery programs (White & Evans, 2014). They are typified by respect for diverse pathways and styles of recovery, and emphasis on long-term continuity of recovery support through mobilization of personal, familial, and community supports (Valentine, 2010; White, 2010). P-BRSS can be delivered through a variety of organizational venues and a variety of service roles including paid and volunteer recovery support specialists. A common function of P-BRSS is to facilitate and support patients' transition between levels of care, in addition to connecting patients with community-based recovery support services and mutual aid organizations in ways not possible for conventional treatment providers (Valentine, 2010; White & Evans, 2014). P-BRSS have seen uptake across a diverse range of SUD treatment settings, and are now utilized across the continuum of SUD care, emerging as a critical component of recovery management (White, 2009; Kelly and White, 2012). The exact prevalence of peer recovery support services in SUD treatment settings, however, is currently not known.

3.1.2 Research Summary of P-BRSS

A systematic search of the literature (as of 8/8/2017), using the search terms “recovery coaching”, “peer recovery support”, “peer-based recovery support services”, and “individual peer support” in combination with substance use terms (see specific syntax in Appendix A), identified 143 records across five publicly available databases (i.e., PubMed, EMBASE, CINAHL, CENTRAL, and PsycInfo). A title screen removed 95 duplicate records, 11 records on non-relevant topics (e.g., peer support for recovery for problem unrelated to addiction), and 1 article on mutual help organizations. An abstract review removed an additional 14 records: 7 book chapters (removed because they were not peer reviewed and did not report original data), 4 records on non-relevant topics, 2 review articles, and 1 article because it reported on a mandated to treatment sample. A full text review removed another 11 records: 4 review and 7 theoretical articles. The remaining eleven studies were included in the analysis and are summarized in Table 1.

While a compelling case has been made for P-BRSS in a number of theoretical articles and book chapters (e.g., Bora, Leaning, Moores, & Roberts, 2010; Cicchetti, 2010; Powell, 2012; Valentine, 2010; White, 2009, 2010, 2011; White & Evans, 2014), to date empirical research on the topic is limited. Including the first peer-reviewed study on P-BRSS in 1998, there have been three randomized controlled trials, two quasi-experiments, as well as one single-group prospective and one single-group retrospective study, and four cross-sectional investigations conducted on this topic. To begin to provide some context for the evidence base for P-BRSS, these studies are reviewed here. Randomized controlled trials (RCTs) are addressed first, followed by single-group prospective and retrospective studies, and finally cross-sectional and qualitative investigations (see table 1a). Bernstein and colleagues (2005) conducted the first RCT of a peer recovery support intervention in a sample of 1,175 out-of-treatment adults reporting past 90-day cocaine and/or heroin use who were receiving general medical care from an urban

hospital walk-in clinic. Participants received one of two interventions: either a brief, single session, structured peer education session targeting drug use cessation, which included written advice and a referral list as well as a ‘booster’ telephone call (experimental group), or written advice and referral list only (control group). Their sample was on average 38 years old, 29% female, 62% non-Hispanic Black, 23% Hispanic, 12% non-Hispanic White, and approximately half were homeless (46%). Though participants were not screened for psychopathology, Addiction Severity Index scores for the sample suggest significant SUD-related impairment. The authors found that compared to controls, at a 6-month follow-up participants receiving a brief peer-support intervention were more likely to be abstinent from cocaine, and trended toward greater heroin, and combined cocaine and heroin abstinence ($p = .05$). A trend was also observed in reduced bioassay measured cocaine use, but not heroin use. Also, those receiving the peer-support intervention demonstrated a trend toward greater reductions in Addiction Severity Index drug subscale and medical severity scores ($p = .06$). No group differences were noted in detoxification or treatment admissions among those who were abstinent.

In a demographically similar sample, Rowe et al. (2007) compared the effectiveness of ‘Citizenship Training’ (which included weekly classes supporting social participation and community integration) plus peer support combined with standard clinical treatment (experimental group), with standard clinical treatment alone (control group), for reducing alcohol and other drug use, and criminal justice charges. Participants were adult outpatients with severe mental illness who had criminal charges within the two years prior to study enrolment. Though having SUD was not required for study participation, the majority of study volunteers had either a primary or secondary SUD diagnosis; 31% had an alcohol use disorder, and 42% had other drug SUD. The sample was on average 40 years old, 32% female, 58% African American, 31% Caucasian, 3% Native American, and 8% described themselves as ‘Other’; 15% endorsed Hispanic ethnicity. Over the 4-month study period participants attended an average of 10.6 Citizenship Training classes, and met once weekly with their peer-mentor. Citizenship Training with peer-support *reduced* alcohol use over 12-month follow-up, while controls demonstrated *increased* drinking over the same period. It is not clear, however, whether these effects were driven by the Citizenship training itself, peer support, or a combination of the two. Notably, both control and experimental groups demonstrated significantly less non-alcohol drug use and had fewer criminal justice charges over the 12-month study period.

In contrast to the aforementioned studies, which utilized either single session, peer-delivered intervention (Bernstein et al., 2005) or peer support as an addendum to a professional-delivered treatment (Rowe et al., 2007), Tracey and colleagues (2011) compared a completely peer-driven treatment that included peer-led groups as well as peer support, to a professional-delivered treatment but also with some peer support in a sample of 96 veterans receiving inpatient treatment (TAU). Study conditions included, 1) TAU + peer-led groups and weekly peer mentorship, 2) TAU + a dual recovery intervention involving 8 weeks of clinician-delivered individual and group relapse prevention therapy in addition to peer-led groups and weekly peer mentorship, and 3) TAU only. 88% of participants had an alcohol use disorder or

other SUD, in addition to psychiatric comorbidity. The sample was on average 56 years old, 97% male, 57% African American or Black, 25% White, 13% Hispanic, 1% Native Hawaiian or Pacific Islander, and 4% other. Compared with TAU alone, TAU combined with peer-delivered treatment, and TAU combined with professional-delivered treatment and peer support were both associated with greater post-discharge, outpatient substance use treatment attendance compared to TAU alone. These two interventions were also associated with greater general medical and mental health appointment adherence, as well as more inpatient substance use treatment, suggesting that at least in terms of treatment adherence, peer-delivered treatment alone does as well as clinician-delivered treatment coupled with peer support. Substance use outcomes were not reported.

Quasi-experimental studies addressing P-BRSS generally support findings from the aforementioned RCTs. In a sample of patients hospitalized for alcohol and other drug detoxification, Blondell et al. (2008) found that a brief peer-delivered counseling intervention resulted in greater likelihood of mutual-help meeting attendance the first week following detoxification discharge. Two trends were also observed: those receiving peer counseling were more likely to remain abstinent from all substances ($p = .06$), and were also more likely to initiate professional aftercare treatment compared to controls ($p = .06$).

Work by Boisvert et al. (2008) suggests that P-BRSS may also bolster patients' perceived support. In a sample of adults with SUD and severe mental illness living in permanent supportive housing, the authors found that participants in their peer-support recovery program reported increased perceived emotional, informational, tangible and affectionate support from pre- to post-intervention. Additionally, participants in the peer-support recovery program had lower relapse rates over the 12-month study period compared to a sample of residents living in the permanent supportive housing setting the year prior to instigation of the peer-support program.

Single group prospective and retrospective studies addressing P-BRSS provide consistent in the pattern of findings for P-BRSS. Boyd and colleagues (2005) piloted a 12-week peer-delivered psychoeducation program for women with HIV living in rural areas. Though no inferential analyses were conducted due to the small sample size ($N=13$), results intimate the authors' brief peer-counseling intervention may increase participants' recognition that their alcohol and other drug use is problematic, and increase desired change behaviors. Work by Armitage and colleagues (2010) suggests P-BRSS may also be beneficial to individuals in sustained SUD remission. The authors found that 6 months following participation in a peer-to-peer recovery support program emphasizing active citizenship and social engagement, 86% of their clients reported no past 30-day alcohol or other drugs use, and another 4% indicated reduced use. Further, 95% reported strong willingness to recommend the program to others, 89% found services helpful, and 92% found provided materials helpful.

The cross-sectional literature further characterizes the potential of P-BRSS based interventions in a range of treatment settings. Sanders and colleagues (1998) sought to compare client satisfaction with peer-delivered SUD counseling, with counseling from traditionally-trained addiction counselors. They found that although there were no between-group differences in overall treatment satisfaction, women receiving ongoing SUD counseling from a peer-counselor were more likely to describe their counselors as empathic, to identify them as the most helpful aspect of the program, to utilize other clinic resources, and to more strongly recommend the treatment program, compared to clients receiving counseling from traditionally-trained providers. Min et al. (2007) assessed whether a long-

term, peer-mentorship intervention for individuals with SUD and severe co-occurring mental illness has the capacity to reduce rehospitalization rates. Survival analysis results over a 3-year period indicate that peer-support program participants had longer periods living in the community without rehospitalization, and a lower overall number of rehospitalizations, compared to a sample of comparable controls not engaged in peer-mentorship. Relatedly, Deering et al. (2011) sought to better understand the effects of a peer-led, mobile outreach program for female sex workers. 242 women were surveyed every six months over 18 months. Women were more likely to utilize the peer-led outreach service if they were at higher risk due to factors such as seeing >10 clients per week, working in isolated settings, injecting cocaine, or injecting/smoking methamphetamine in past 6 months. Utilizers of the peer-led service, however, were also more likely to access the intervention's drop-in center, and notably, after statistically controlling for inter-individual differences, past 6-month use of the peer-led outreach program was associated with a four-fold increase in the likelihood of participants utilizing detoxification and/or inpatient SUD treatment.

One cross-sectional study has also assessed the motivation of individuals in recovery from SUD to seek P-BRSS. Wanting to know more about university students participating in peer-based college recovery support services, Laudet et al. (2016) surveyed 486 students participating in 29 college recovery programs across the United States. At the time of survey, students had been sober an average of 3 years. One third of the sample reported they would not be in college were it not for a peer-based, collegiate recovery program, and 20% would not be at their current institution. Top reasons cited for joining collegiate recovery programs were the need for same age peer recovery support, and wanting to maintain their sobriety in the high-risk college environment.

3.1.2 Summary and Implications of P-BRSS Findings

Taken together, results from the emerging P-BRSS literature suggest P-BRSS may have potential to reduce substance use and increase treatment engagement and adherence. Findings should be tempered by the fact the reviewed RCTs did not use an intent-to-treat design, potentially introducing sample bias into the results. Additionally, the RCTs to date have all studied individuals with severe SUD and co-occurring mental illness who have major impairments in psychosocial functioning. It is thus unclear how these results might generalize to those with less severe SUD or without psychiatric comorbidity. There is a stark lack of comparative studies examining the relative incremental benefit of P-BRSS as an adjunct or extension to the most commonly-received forms of outpatient or inpatient SUD treatment among more commonly-served SUD patients. It should be noted also that, by nature, much of the non-RCT research is based on convenience sampling and survey analysis. More RCTs are needed on this topic to validate, and expand upon reported findings. The studies highlight also some ethical and practical challenges presented by this novel class of interventions for SUD. For instance, individuals providing peer support face boundary issues as their work typically lies at the intersection of purely-peer, and purely-clinical, support roles. Their work lacks the clarity of the professional treatment realm with its clear differentiation between paid professional staff and patients, and the mutual-help, 12-Step tradition, with its well-articulated, and well established non-professional traditions.

Regardless, the work to date makes a case for further uptake of P-BRSS across a range of clinical and recovery support service settings, and peer support specialists roles will, no doubt, become increasingly better defined as peer-supports are integrated more and more into the

spectrum of SUD care. How (mechanisms studies) and for whom (moderator studies), in particular, P-BRSS may be most suited has not been investigated and cost-effectiveness studies are also lacking.

3.2. Recovery Community Centers (RCCs)

3.2.1 Nature, scope, origin, and prevalence of RCCs

Recovery community centers (RCCs) are emerging as an important third tier component of recovery-oriented systems of care (Kelly & White, 2010) that, until recently, was comprised solely of professional treatment and mutual-help organizations (White, Kelly, & Roth, 2012). RCCs are recovery-oriented sanctuaries anchored in the heart of the community (Valentine, 2010), which provide a range of recovery-oriented, peer-delivered services (Haberle et al., 2014). RCCs are meant to be located in a central physical location within a community (Haberle et al., 2014; Valentine, 2010), so as to put a visible, de-stigmatizing face on recovery, and so as to serve as a convenient, easily-accessible base of operations for the local recovery community (Valentine, 2011). Services are organized and coordinated by a small number of paid staff, and delivered largely by peer volunteers. These services include assisting people in addressing their basic material, instrumental, and social needs for housing, income, health care, transportation, child care, and social support; connecting people to opportunities for education, employment, social-leisure activities, and civic participation; and affording people a worthwhile sense of identity and meaningful sense of belonging to a positive peer group (Haberle et al., 2014).

RCCs grew out of the recovery advocacy movement in America, which began in the late 1990s (White, 2007). Early findings had demonstrated the value of social services added to standard addiction rehabilitation (McLellan et al., 1998), and highlighted the role of mutual-help groups in sustaining long-term recovery from substance use problems (Morgenstern, Labouvie, McCrady, Kahler, & Frey, 1997). In 1998, the Center for Substance Abuse Treatment (CSAT) of the federal Substance Abuse and Mental Health Services Administration (SAMHSA) funded recovery programs (e.g., Armitage, Lyons, & Moore, 2010) in its first round of the Recovery Community Support Program (RCSP), a program that remains active today. To our knowledge, the first RCC, the Connecticut Community for Addiction Recovery (CCAR), was founded in 2004 (Valentine, 2011), though it is difficult to pinpoint the exact point in time, as RCCs typically grew out of pre-existing recovery organizations (e.g., Armitage et al., 2010; Valentine, 2011). During its first 7 months of operation, this first RCC served more than 2,300 individuals (Valentine, 2011). More generally, RCCs have emerged as a growing source of community recovery support. Currently, it is estimated conservatively that there are approximately 100 RCCs nationally, with a high concentration located in the northeast region of the United States (n=34) (personal communication, Faces and Voices of Recovery). 61% of California counties (n=35) report having at least one RCC in their county (Cousins, Antonini, & Rawson, 2012). Our own nationally representative survey of US adults shows that 6.2% of adults who have successfully resolved a significant substance use problem have used an RCC (Kelly, Hoepfner, Bergman, & Vilsaint, 2017). This translates at the population level into about 1.4 million people, which is remarkably high, given the relatively short period of time since their inception in 2004.

RCCs fill an important niche. Like AA clubhouses, they offer social fellowship. Like a social-service drop-in center, they offer tangible services embedded within a support mission. Yet beyond these benefits, RCCs also offer emerging recovery support services, such as

recovery coaching and telephone support with follow-up protocols (Haberle et al., 2014; Valentine, 2011). Moreover, an important contextual factor is that RCCs are not allied with any specific recovery philosophy or model (e.g., 12-step; religious; secular), and recognize that there are multiple pathways to recovery. This is a critically important aspect of these facilities in a field where partisan approaches can create unnecessary barriers to recovery for some (Kelly & White, 2012).

3.2.2 Research Summary of RCCs

Empirical data on the effectiveness of RCCs is currently extremely limited. RCCs are increasingly being mentioned as a currently existing peer-based service (Bassuk, Hanson, Greene, Richard, & Laudet, 2016; Laudet & Humphreys, 2013), but rarely are described. A systematic search of the literature (as of 8/8/2017), using the search terms “recovery community center”, “recovery center”, “recovery support center”, “peer support center”, “recovery community organization”, or “peer participatory model” in combination with substance use terms (see search syntax Appendix A), identified 218 records across five publicly available databases (i.e., PubMed, EMBASE, CINAHL, CENTRAL, and PsycInfo). A title screen removed 97 duplicate records, 67 records on non-relevant topics (e.g., recovery from surgery, recovery centers for nutrition), and 9 dissertations (removed, because they are not peer-reviewed). An abstract review removed an additional 31 records (15 news and opinion type of articles in magazines or editorial sections, 3 papers about residential centers, 1 patient case report, and 12 papers recruiting from RCCs, but not studying RCCs), leaving 14 papers for a full-text review. Of these, 8 were descriptive accounts with no data, 1 was published in a foreign language, 1 was on a recovery center for impaired professionals, 1 was a cross-sectional study of a community-based center offering onsite mental health services (Mendelson, Dariotis, & Agus, 2013), and 3 presented data on RCCs. All three of these papers were based on longitudinal assessments, all of them reporting 6-month outcomes. These studies are summarized in Table 1b. All three papers reported on prospectively collected, single-group design data, and reported outcomes on SAMHSA’s Government Performance and Results Act (GPRA)/National Outcome Measure tool.

Haberle et al. (2014) report 6-month outcome data on n=385 participants who used the Pennsylvania Recovery Organization-Achieving Community Together (PRO-ACT) during the years 2008-2011. Details on the recruitment and retention rates of the n=385 are not provided, but a comparison to the demographic composition of all of the RCC participants who received recovery support services during this time (n=6,326) is provided, which shows that the sub-sample with longitudinal data was largely similar to the overall population, except that GPRA respondents were more likely to be female, older, and of a greater level of education. Comparisons of baseline to 6-month self-reports show that substance use outcomes were largely maintained, with 92-95% reporting abstinence from alcohol and/or drugs, respectively, at the 6-month follow-up. Living conditions had shifted from primarily recovery housing at baseline (54%, 34% at 6-month) to owning and renting at 6-month-follow-up (53%; 30% at baseline). Similarly, employment status had shifted from primarily “unemployed; looking” (43%, 32% at 6-month) to increasingly employed either full-time (22%, 10% at baseline) or part-time (16%, 11% at baseline). Formal statistical analyses were not conducted.

Mericle et al. (2014) report data on participants of the Phoenix House Bronx Community Recovery Center (BCRC), a recipient of an NIH H79 grant. Participation in the survey was restricted to adults living in Bronx, who could provide locator information to be re-contacted

6 months later. The completion of follow-up surveys was 90%, providing data on n=260, who completed both baseline and 6-month follow-up surveys. Compared to PRO-ACT participants, BCRC participants were slightly less likely to be abstinent from alcohol and/or drugs at baseline (74%). At 6-month follow-up, these rates increased statistically significantly, with more participants reporting abstinence from alcohol (91%), illegal substances (89%), or both (85%). Similarly to PRO-ACT participants, BCRC participants reported shifts in employment status, where BCRC reported statistically significantly greater rates of full-time (14%, 5% at baseline) and part-time (7%, 1% at baseline) employment. Statistically significant gains were also made on education outcomes (13% full-time enrollment, 7% at baseline), criminal justice status (i.e., fewer crimes, on parole, charges pending), social connectedness (i.e., more attendance of faith-based mutual-help groups and other recovery meetings) and select mental health outcomes (i.e., 14% reporting trouble understanding and remembering, 24% at baseline).

Armitage et al. (2010) report data on participants of the Recovery Association Project (RAP), Portland, Oregon. GPRA data was gathered on 152 RAP participants. Recruitment and retention rates were not reported. Similarly to PRO-ACT and BCRC participants, the vast majority of RAP participants reported complete abstinence from substance use at 6-month follow-up (86%). Outcomes on educational and vocational status were not reported, but the paper commented that RAP made significant progress on program goals, not all of which necessarily involved participant outcomes at this early stage of the program's existence (e.g., reducing stigma, building RAP's capacity to provide peer recovery services long-term). The vast majority of surveyed RAP participants found the services and materials provided helpful (89% and 92%, respectively).

Not currently published in the literature, other than in abstract format, are results from our own NIAAA-funded study on RCCs (R21AA022693; PI: Kelly). The purpose of this ongoing study is to characterize RCCs in the Northeastern United States via director interviews and participant surveys, and to document new RCC participant outcomes 3 months after beginning to attend the RCC. A total of 32 RCCs are included in this study. Results of the director surveys show that the included RCCs have been in operation 8.5 ± 6.2 years, have on average 46 ± 37 visitors per day, where visitors spend on average 2.4 ± 1.1 hours per visit. The majority of participants at the centers are seeking recovery from primary alcohol and opioid problems (Fallah-Sohy et al., 2016).

3.2.3 Summary and Implications of RCCs Findings

In sum, the results of our systematic literature review show that data on the effectiveness of RCCs is currently very limited, with only 3 papers reporting outcome data on this important and expanding component of recovery-oriented systems of care (Kelly & White, 2010). While existing results are limited by a lack of information on recruitment and retention rates (Armitage et al., 2010; Haberle et al., 2014), thereby making it unclear to what degree reported findings are generalizable and free from attrition biases, results are nevertheless highly promising, suggesting that RCCs are effective in maintaining or enhancing abstinence, and that RCC participants attain important vocational and educational shifts during a 6-month period. More studies are urgently needed to further assess outcomes in a group-comparison design, using additional outcomes (e.g., World Health Organization criteria on substance use [Witkiewitz et al., 2017], quality of life), and tracking recruitment and retention rates more rigorously, so as to assess the generalizability and validity of results. Of note, RCCs are increasingly being sought out as the

point of contact in research studies on persons in recovery, as evidenced by the 11 studies we identified as part of our systematic literature review that were conducted with RCC participants, which suggests that over time, these centers are establishing closer ties with the research community and vice versa. This bodes well for future research activities on this important recovery support resource.

3.3. Recovery support Services in Educational Settings

3.3.1 Nature, scope, origin, and prevalence of RSS in Educational Settings

Education-based recovery support services are comprised of recovery high schools and collegiate recovery programs (CRPs), which emerged in the 1980s and 1970s, respectively, to support students in their recovery while also helping them achieve their academic goals (White & Finch, 2006). Recovery high schools vary in size and structure, with enrollment ranging from 2-115 students (Association of Recovery Schools, 2016a), and existing as both independent schools and programs embedded within another school (Finch, Moberg & Krupp, 2014). Collegiate recovery programs also range in size and structure, with student enrollment ranging from 10 (Laudet, Harris, Kimball, Winters & Moberg, 2015) to 50 students (Cleveland, Harris, Baker, Herbert, & Dean, 2007). Whereas recovery high schools are professionally led (Finch, Moberg & Krupp, 2014), CRPs are often peer-driven, with a limited professional staff (Laudet et al., 2015). Though no single model for recovery high schools or CRPs exists, education-based recovery support services have continued to grow in recent years, with a reported 40 recovery high schools currently in operation (Association of Recovery Schools, 2016b), and close to 50 CRPs in development or operation in the United States (Laudet, Harris, Kimball, Winters, & Moberg, 2016).

3.3.2 Research Summary of RSS in Educational Settings

Despite recent growth of recovery high schools (ARS, 2016a) and CRPs (Laudet et al., 2015) very little is known scientifically about these resources. A systematic search of the literature (as of 8/8/2017), using the search terms “collegiate recovery”, “recovery school”, “recovery high school”, “recovery hous*”, “university-based recovery center”, or “university based recovery center” in combination with substance use terms (see Appendix A), identified 482 records across five publicly available databases (i.e., PubMed, EMBASE, CINAHL, CENTRAL, and PsycInfo). A title screen removed 328 duplicate records and 70 records on non-relevant topics or that were not peer-reviewed. An abstract review removed an additional 74 records, leaving 10 papers for a full-text review. One additional article was identified through reference list searching and also assessed for inclusion. Of the 11 articles assessed for inclusion, one was excluded because its primary focus was on the structural characteristics of recovery high schools (e.g., physical and organizational structure, staff description), rather than student outcomes (Finch et al., 2014). The remaining two articles (Kimball, Shumway, Austin-Robillard, Harris-Wilkes, 2017; Zheng, Wiebe, Cleveland, Harrington, Molenaar, & Harris, 2013) were two of several studies that draw samples from a recovery high school or CRP, but do not specifically examine the impact of these programs on substance use and related outcomes, and are therefore not included in the present review (e.g., Karakos, 2014; Ratterman, 2014; Russell, Trudeau, & Leland, 2015; Russianova et al., 2014; Vosburg et al., 2016). Thus, we identified eight studies that focus on recovery high schools or CRPs, two of which are single-group prospective studies, five are cross-sectional, and one is qualitative. These studies are further summarized in table 1c.

Overall, study samples ranged in size from 15 (Bell et al., 2015) to 489 participants (Laudet et al., 2015; Laudet et al., 2016) and were predominately white, with one study of 17 recovery high schools (Moberg & Finch, 2008) reporting 78% of students in their sample are white, and others reporting rates above 90% (Botzet, Winters & Fahnhorst, 2007; Cleveland et al., 2007; Bell et al., 2009; Cleveland & Harris, 2010; Laudet et al., 2015; Laudet et al., 2016). Studies also included participants whose primary addictions were to alcohol or other drugs, and in some cases were behavioral addictions (e.g., eating disorder, sex/love addiction, gaming/gambling, etc.; Bell et al., 2009; Botzet et al., 2007; Cleveland & Harris, 2010; Cleveland et al., 2007; Lanham & Tirado, 2011; Laudet et al., 2015; Laudet et al., 2016; Moberg & Finch, 2008).

In their single-group prospective study of 55 students in a CRP, Cleveland and Harris (2010) evaluated 1,304 end-of-day reports (made across 24 days) wherein students made diary entries describing their daily conversations in terms of frequency, type (i.e., recovery focused or not), and context (i.e., occurring inside or outside the collegiate recovery center). Participants also completed daily measures of negative affect and cravings. Results showed that greater cravings and negative affect are associated with more recovery-focused conversations outside of the CRP.

In their survey of 37 CRP alumni and 45 current students, Botzet, Winters, and Fahnhorst (2007) found that only one out of 46 current students (2.2%) and eight out of 37 alumni (21.6%) reported using alcohol or drugs in past 6 months (cross-sectional). Importantly, however, among the 20 students assessed over time, there were no significant improvements in outcome variables (e.g., physical health problems, depression and anxiety symptoms, etc.), which notably did not include substance use.

Of the five cross-sectional studies, three evaluated CRPs (Cleveland et al., 2007; Laudet et al., 2015; Laudet et al., 2016). Cleveland et al. (2007) surveyed 82 current students attending a CRP at Texas Tech University. Researchers found that most members attending the program were performing well academically, with 82.5%, 52.5%, and 22.5%, of students reporting a GPA above 2.75, 3.25, and 3.75, respectively, suggesting a positive relationship between CRPs and good academic outcomes. The two other cross-sectional studies of CRPs (Laudet et al., 2015; Laudet et al., 2016) were both based on the first national survey of students ($n = 486$) from 29 CRPs. Students' primary reasons for joining their respective CRP included the need for a peer network that is supportive of their recovery (80%), as well as desires to continue to be sober in college (31%) and to give back to their recovery community (14%; Laudet et al., 2016). Overall, rates of substance use were low, as it had been, on average, 952 days since members had their last drink, and 1,053 days since they last used other drugs (Laudet et al., 2015; Laudet et al., 2016). Only 5.4% of students reporting drinking alcohol or using drugs in the past month. It is also important to mention that 1 in 6 students reported being in recovery from a behavioral addiction, with a small percentage having engaged in these behaviors in the past 90 days (eating disorder (11.3%); sex/love addiction (11.3%); self-harm/injury (5.3%); gaming/gambling addiction (5.1%); compulsive shopping (8%); internet addiction (other than for sex, gambling or shopping; 3.1%); exercise (2.9%)).

Only two studies evaluated recovery high schools, both of which were cross-sectional (Lanham & Tirado, 2011; Moberg & Finch, 2008). In a survey of 321 students across 17 recovery high schools in six states, Moberg and Finch (2008) found that 78% of students reported past substance use disorder treatment, and 80% currently attend weekly 12-step mutual-help organization meetings. Based on student reports of current substance use and substance use in the 12 months prior to recovery high school admission, weekly alcohol, cannabis, and other illicit substance use significantly decreased, from 90% to 7%. Also based on retrospective report,

students who had attended the school for at least 90 days ($n = 174$) reported an average percentage of days abstinent (PDA) from substances of 32 in the 90 days prior to attending, and an average PDA of 82 since they began attending.

Additionally, Lanham and Tirado (2011) surveyed 72 students who graduated from Serenity High School in Texas between 2000 and 2010. Nearly 40% of respondents reported abstinence within the past 30 days, 4% reported non-problematic use of drugs or alcohol, and 60% reported either abstinence or consuming alcohol but not illicit drugs in the past 30 days. Notably, there was no significant difference in the average number of years since graduation among graduates who were abstinent ($M = 4.1$ years) and those who were not ($M = 3.9$ years). Among abstinent graduates, 39% re-entered treatment after graduation, whereas only 14% of non-abstinent graduates re-entered treatment after graduation.

Finally, Bell et al., (2009) conducted semi-structured interviews with 15 students in a CRP. Among their primary aims, researchers sought to determine the most helpful aspects of participating in a CRP. Students emphasized the importance of having a recovery community on campus, as well as a designated space to spend time, get support from program staff, and see designated academic advisors. Students also highlighted the importance of having on-campus meetings (e.g., AA), as they preferred to meet with their peers rather than more diverse groups outside campus.

3.3.3 Summary and Implications of RSS in Educational Settings

Existing research on education-based recovery support services suggests that students who participate in recovery high schools and CRPs may demonstrate improvements in substance use as well as social and academic outcomes. At present, however, there is no research pointing to recovery high schools and CRPs as the direct cause of such improved outcomes. Furthermore, results from the above mentioned studies must be considered alongside their methodological limitations. Given the descriptive and exploratory nature of many of the existing studies, there are many important gaps in the literature base that are important to fill. For example, given it is less feasible to RCT designs, it will be important for researchers to conduct rigorous, quasi-experimental studies to determine the effect of recovery high schools and CRPs on substance use and related outcomes, from which point researchers can work to determine which aspects of these programs are most beneficial, for whom in particular, and why. Overall, substantially more research is needed to begin forming conclusions about the utility of education-based recovery support. However, given that there is currently only one ongoing study of recovery high schools (Finch, 2011) and one recently completed study of CRPs (Laudet, 2012), education-based recovery support services will require much more empirical attention than they currently receive.

In addition to efficacy, recovery high schools and CRPs face additional challenges that warrant investigation. As previously mentioned, students who utilize these supports are predominately white. Though researchers identify racial disparities in addiction treatment as an ongoing issue (ARC, 2016a), recovery high schools do not reflect the demographic breakdown of their school district (Lanham & Tirado, 2011) or their county (Karakos, Hennesy, & Finch, 2014a). In fact, there are more students of color who receive addiction treatment per capita than attend recovery high schools (Karakos, Hennesy, & Finch, 2014b). One possible avenue for future research is to examine, among other factors, the ways in which students are referred and considered for program admission in order to identify barriers minorities face in accessing these services, as well as strategies for surmounting them. Moreover, it is important for researchers to investigate why, despite the millions of adolescents and young adults with substance use

disorders who are in need of treatment (Lipari, Park-Lee, & Van Horn, 2016), that many recovery high schools report one of their main challenges to be enrolling enough students (Finch et al., 2014). When considering that in the year prior to 2015, there were an estimated 1.3 million adolescents and 5.4 million young adults in need of specialized substance use disorder treatment who did not receive it (Lipari, Park-Lee, & Van Horn, 2015), it is important for researchers work to reconcile the paradox of the adolescent and young adult treatment gap with the enrollment struggles of recovery high schools.

Research on education-based recovery supports remains nascent, with only a handful of generally small studies examining these potentially integral supports for adolescents and young adults in recovery. Well-conducted “proof-of-concept” type studies are needed on a smaller scale (with sufficient number of participants) to confidently assert that such programs may be worthy of further study. Then, larger-scale comparative effectiveness studies might be undertaken and mechanisms, moderators, and cost-effectiveness research conducted to determine how these resources confer benefit and for which students, in particular.

3.4. Mutual-Help Organizations

3.4.1 Nature, scope, origin, and prevalence of Mutual-Help Organizations

Mutual-Help Organizations (MHOs) have existed for over 170 years in the United States, beginning with a society known as “the Washingtonians” that originated in Baltimore in 1840 (White, 1998). Since that time, a number of MHOs have developed and proliferated, with the most common being 12-step organizations (e.g., Alcoholics Anonymous [AA], Narcotics Anonymous [NA]; see Table 2). MHOs consist of individuals with a common experience or problem (e.g., substance use disorders [SUD]) coming together to share their experiences and provide help and support to one another. Most MHOs are completely consumer-run, although a few have some professional involvement (e.g., in the initial organization of a group; Kelly & Yeterian, 2013). MHOs help individuals to attain and sustain SUD remission (or to moderate their substance use in the case of Moderation Management) through mutual support in and between meetings, identification with a fellowship or community, and idiosyncratic strategies, techniques, or philosophies that guide recovery (see Table 2). Groups are available free of charge, although many ask for voluntary contributions to cover costs of space and refreshments (Humphreys, 2004). As shown in Table 2, the prevalence of different MHOs varies widely, with 12-step meetings numbering over 80,000 in North America. On the other end of the spectrum, Moderation Management consists primarily of online meetings, with a handful of group meetings in the U.S.

3.4.2 Research Summary of MHOs

A systematic search of the literature (as of 8/2/2017), using the search terms “mutual help,” “mutual aid,” “self-help group,” “12 step,” “twelve step,” “Alcoholics Anonymous,” “Narcotics Anonymous,” “Marijuana Anonymous,” “Cocaine Anonymous,” “Methamphetamine Anonymous,” “Methadone Anonymous,” “Al-Anon,” “SMART Recovery,” “Moderation Management,” “Women for Sobriety,” “Secular Organizations for Sobriety,” “LifeRing,” “Twelve-Step Facilitation,” “TSF,” or “Intensive referral” in combination with substance use terms (see Appendix A), identified 23,710 records across five publicly available databases (i.e., PubMed, EMBASE, CINAHL, CENTRAL, and

PsycInfo). A title screen removed 16,499 duplicate records, leaving 7,211 papers for abstract screening. Due to the high volume of research, we were unable to provide a full systematic review of this literature across all types of study designs in the time available for this report (for systematic and more comprehensive reviews, see Bog et al., 2017; Ferri, Amato, & Davoli, 2006; Humphreys et al., 2004; Kaskutas, 2009; Kelly & Yeterian, 2012). We focus instead on RCTs and quasi-experimental studies of Twelve-Step Facilitation (TSF), which is a professionally delivered intervention designed to increase MHO attendance and involvement. The voluntary, freely available nature of MHOs precludes efficacy trials in which individuals are directly randomly assigned to attend MHOs or not; RCTs of TSF mitigate this problem by randomly assigning individuals to receive TSF or a comparison intervention. Individuals in any study condition are free to attend MHOs, with the goal of TSF being to increase MHO attendance and involvement beyond what would naturally occur.

We identified 16 RCTs with at least one TSF condition (see table 1d). Four quasi-experimental studies of TSF/12-step programs were included for review (Humphreys & Moos, 2001; 2007; Grant et al., 2017; Kaskutas et al., 2009; Timko et al., 2011). We identified one RCT (Campbell et al., 2016) and one quasi-experimental study (Blatch et al., 2016) of SMART Recovery. However, the quasi-experimental study was not reviewed further due to being conducted with an institutionalized prison sample and not reporting substance use outcomes or other markers of SUD recovery. No RCT or quasi-experimental studies were identified on other MHOs. However, there have been survey-based cross-sectional studies on other MHOs, including Women for Sobriety (Kaskutas, 1996), Moderation Management (Humphreys & Klaw, 2001), and others (Zemore et al., 2017).

Of the 15 RCTs on TSF included for review (table 1d), 14 were conducted with adult samples and 1 with an adolescent sample. Sample sizes ranged from $N = 48$ to $N = 1,726$. Eleven of the studies were conducted with treatment samples, including two with VA samples, whereas the remaining four studies drew samples from the community. All studies included at least one follow-up assessment after the end of treatment assessment. Ten studies included multiple follow-up assessments, with the longest follow-up period being 27 months after baseline. The majority of studies (11/15) had retention rates $\geq 70\%$, suggesting a potential risk of attrition bias in the remaining three studies. TSF interventions varied in length (1-48 sessions; modal length = 12 sessions) and format (group and/or individual). Eleven studies compared TSF to another active treatment condition (e.g., Cognitive Behavioral Therapy [CBT], Relapse Prevention [RP]), while four studies compared TSF to treatment as usual (TAU).

Eight of the fifteen studies found that TSF produced superior outcomes versus comparison conditions on at least one of the primary substance use outcomes measured. Six of these studies included active treatment comparison conditions that matched the TSF condition in length and intensity (Kelly et al., 2017; Litt et al., 2009; 2016; Project MATCH Research Group, 1997; Timko et al., 2006; Walitzer et al., 2008), while the other two studies compared TSF+TAU to TAU only (Carroll et al., 2012; Donovan et al., 2013). The largest of these studies was Project MATCH (Project MATCH Research Group, 1997), which compared 12-session TSF to 12-session CBT and 4-session Motivational Enhancement Therapy (MET). TSF resulted in increased rates of abstinence toward the end of the follow-up period for aftercare patients (i.e., those recruited following inpatient/day programs) compared to CBT and MET, whereas CBT resulted in decreased rates of abstinence compared to TSF and MET among outpatients. Further, TSF produced substantially higher rates of continuous abstinence at 1yr follow-up relative to MET and CBT, with 71% more cases completely abstinent at 1 year compared to MET and 65%

more abstinent compared to CBT (Project MATCH Research Group, 1997). Six studies found no difference between TSF and comparison conditions on primary substance use outcomes, including four studies with active treatment comparison conditions (Blondell et al., 2011; Brown et al., 2002; Kahler et al., 2004; Manning et al., 2012) and two studies with TAU comparison conditions only (Bogenschutz et al., 2014; Hayes et al., 2004). Of note, both Kahler et al (2004) and Manning et al (2012) both found important moderator effects with a brief advice TSF better producing better abstinence outcomes compared to a longer (one hours) motivational interview-TSF among patients who had already had prior 12-step experience (Kahler et al, 2004) and, compared to a peer-delivered TSF, a doctor-delivered TSF was substantially better at getting patients involved in 12-step MHOs in the three months following inpatient discharge (Manning et al, 2012). One study (Lydecker et al., 2010) found that TSF was inferior to the comparison condition on abstinence rate. This may reflect the suitability of the comparison condition, an integrated CBT protocol for depression and SUD, for the sample, who were veterans with depression and SUD.

Three quasi-experimental studies have tested TSF interventions in treatment-seeking samples, including two VA treatment samples. TSF interventions ranged from 3-6 sessions, with only one of the three studies including a control condition that matched TSF in length and intensity (Kaskutas et al., 2009). Two of the three studies (Kaskutas et al., 2009; Timko et al., 2011) found that TSF was superior to control conditions on at least one of the primary outcomes measured, whereas the remaining study found no difference between TSF and standard MHO referral (Grant et al., 2017). Another quasi-experimental study examined differences in healthcare utilization and costs among veterans treated in VA 12-step-based programs vs. CBT programs (Humphreys & Moos, 2001; 2007). This study found that healthcare costs were 30-40% *lower* for veterans treated in 12-step programs vs. CBT programs across a 2-year follow-up period, translating into an average savings of \$2,440-\$5,735 per patient. Notably, other outcomes pertaining to psychiatric problems and substance use consequences were similar across conditions, except that a higher percentage from 12-step programs reported complete abstinence at 1- and 2-year follow-ups, compared to CBT (one third more).

In the single RCT of a non-12-step MHO (Campbell et al., 2016), SMART Recovery (SR) attendees were randomly assigned to participate in SR only or SR + Overcoming Addictions, a web-based intervention based on SR principles and techniques. This study found no differences between conditions in substance use outcomes, suggesting no additive effect of the online intervention. The large quasi-experimental study by Blatch and colleagues in Australia (Blatch et al., 2016) did find a benefit for SMART participation and prison-based SMART intervention on crime recidivism outcomes, but did not report substance use outcomes.

3.4.3 Summary and Implications of MHOs

Most research to date has been conducted on the largest and most available MHO, AA. The evidence in this regard is strong. TSF interventions and AA participation is associated with improved substance use outcomes, particularly prolonged abstinence and remission, and is likely to be highly cost-effective. More research is needed on 12-step MHOs other than AA, as well as on non-12-step MHOs of all kinds. A relatively large amount of sophisticated mechanisms research has been conducted also on AA to understand how it confers benefits (Kelly, Magill et al, 2009; Kelly, 2017) revealing that AA increases abstinence and remission rates through its ability to mobilize adaptive changes in cognitive-behavioral coping skills, abstinence self-efficacy, recovery motivation, spirituality, social networks, impulsivity, and craving. Given the

commonalities in the social and peer-led nature, scope, and recovery focus of different recovery MHOs, it is reasonable to assume that participation in MHOs other than AA would confer similar recovery benefit at analogous levels of attendance (Kelly and Yeterian, 2013).

Table 2. Mutual-Help Organizations for SUD

Name and website	Target problem	Number of groups in U.S. and Canada	Theoretical Orientation	Therapeutic goal(s)	Key Interventions
Alcoholics Anonymous (AA) aa.org	Alcohol	56,000 groups US 5,800 groups in Canada Online meetings	12-Step/"spiritual"	Abstinence	<ul style="list-style-type: none"> • Belief in higher power of individuals' own choosing • Sponsorship • Working the Steps • Service to others and the group
Narcotics Anonymous (NA) na.org	Any drug, including alcohol	15,000 groups in US 1,000 groups in Canada Online meetings			
Cocaine Anonymous (CA) ca.org	Cocaine /crack	2000 groups in US 150 groups in Canada Online meetings			
Methadone Anonymous (MA) methadonesupport.org	Opiates	100 groups in US 5 groups in Canada Online meetings			
Moderation Management (MM) moderation.org	Problem drinking	Mostly online meetings 25 groups in US No groups in Canada	Cognitive-behavioral	Moderate drinking; harm reduction	<ul style="list-style-type: none"> • 30 days of abstinence • Monitoring and limiting alcohol intake • Awareness of triggers
Self-Management and Recovery Training (SMART Recovery) smartrecovery.org	All addictive behaviors	500 groups in US 25 groups in Canada (1,300 worldwide); Online meetings	Cognitive-behavioral	Abstinence recommended, moderate use acknowledged as possibility	<ul style="list-style-type: none"> • Enhancing and maintaining motivation • Learning to cope with urges • Managing thoughts, feelings, and actions • Balancing short- and long-term needs
Secular Organization for Sobriety, a.k.a. Save Ourselves (SOS) sossobriety.org	Alcohol and/or drugs	480 groups in US 25 groups in Canada Online meetings	Humanistic/Existential	Abstinence	<ul style="list-style-type: none"> • Self-empowerment • Specific interventions determined by individual
LifeRing lifering.org	Alcohol and/or drugs	120 groups in US (mostly Northern CA); 13 groups in Canada; online meetings	None	Abstinence	<ul style="list-style-type: none"> • Positive reinforcement from the group • Specific interventions determined by individual
Women for Sobriety (WFS) womenforsobriety.org	Alcohol	150-300 groups in US Canadian data not available Online meetings	Cognitive	Abstinence	<ul style="list-style-type: none"> • 13 affirmations • Positive thinking • Relaxation, diet, exercise • Approval and encouragement from group

Note: Table adapted from Kelly & Yeterian (2013)

3.5 Recovery Housing

3.5.1. Origin, nature, scope and purpose, and prevalence.

Recovery Housing existed for over 170 years in the United States, the first such residence was a room established in 1841 to support members of the newly formed Washingtonian Temperance Society (NARR, 2012). Since that time, a number of recovery residencies have developed, with early models being halfway houses which grew to include Sober Living Environments and the Oxford House. Recovery residencies consist of individuals with a common experience or problem (e.g., substance use disorders [SUD]) residing together in a

safe and supportive living environment that is free of alcohol or other drugs. At a minimum, recovery residencies offer peer-to-peer recovery support with some providing professionally delivered clinical services all aimed at promoting abstinence based, long-term recovery. Residents in these houses often engage in decision making and management of the facility, financial self-sufficiency, informal case management for each other, giving advice borne of experience about how to access health care, find employment, manage legal problems, and interact with the social service system (Dept. Health and Human Services, 2016). Recovery residencies are typically accessed following formal addiction treatment and can provide both a sober environment as well as the mutual support obtained from recovering fellow residents. The exact number of recovery residencies is unknown because they are out of the purview of state licensing agencies (Johnson, Marin, Sheahan, Way, & White, 2009). Some recovery residencies are part of the National Alliance of Recovery Residencies, a non-profit organization that services 25 affiliate organizations that support more than 25,000 persons in recovery across 2,500 certified recovery residencies.

3.5.2. Review of the available evidence on Recovery Residencies

A systematic search of the literature (as of 8/8/2017), using the search terms “oxford house”, “oxford home”, “sober living”, “sober living ho*”, “sober living environment”, “recovery residence”, “halfway house”, “halfway residence”, “transitional house”, “domiciliary”, “wet house”, or “dry house” in combination with substance use terms (see Appendix B), identified 1435 records across five publicly available databases (i.e., PubMed, EMBASE, CINAHL, CENTRAL, and PsycInfo) from which Endnote software identified 764 duplicate records to be removed. A title screen removed 98 duplicate records and 305 other records on non-relevant topics. An abstract review removed an additional 138 records, leaving 122 papers for a full-text review (119 in Endnote plus 3 additions identified in the literature). Of these, 21 were descriptive accounts, 12 were cross sectional, 35 were single group retrospective, 36 were single group prospective, 10 described a RCT (3 of which were distinct base studies Tuten et al, 2012; Jason et al, 2006; Jason, 2015), and 8 quasi-experimental designs. All 18 of the RCT and quasi-experimental designs are summarized in Table 1e.

Oxford Houses are a type of sober housing. They are democratically run self-supporting homes that have no time limit for how long a resident can live there while abstinent from alcohol and other drugs. Studies examining the effects of Oxford House on individuals with SUD have shown positive results. In an RCT, Jason and colleagues (2006) recruited participants from residential treatment prior to discharge and assigned them to either Oxford House or a standard continuing care condition that was arranged by the participant such as outpatient treatment, self-help groups, and alternative living arrangements. Oxford House participation reduced the odds of substance relapse by 63% compared to continuing care as usual, between the one and two year follow up (Chavarria, Stevens, Jason, Ferrari, 2012). At the two year follow up residents were more than two times more likely to be abstinent, had higher monthly incomes and lower incarceration rates than similar individuals assigned to receive standard continuing care (Jason, Olson, Ferrari, & Lo Sasso, 2006). Further, the overall net benefit was higher for Oxford House residents when accounting for the costs of healthcare, criminal activity, incarceration, alcohol or other drug use, and employment during this 2-year span (Lo Sasso, Byro, Jason, Ferrari, & Olson, 2012) with benefits over two years of approximately \$29,000 per participant. Longer stays in an Oxford House were related to better outcomes; this was particularly true for younger residents, who had better outcomes if they stayed at least six months (Jason, Olson, Ferrari,

Majer, Alvarez, & Stout, 2007). In addition, longer stays in an Oxford House were related to having more people in a social network who were in recovery, and unlike standard continuing care, the number of heavy drinkers in the network did not increase over time (Mueller & Jason, 2014). Among participants with co-occurring post-traumatic stress disorder, levels of self-regulation were higher among Oxford House residents (Jason, Mileviciute, Aase, Stevens, DiGangi, Contreras, & Ferrari, 2011). Such beneficial effects of recovery housing may be further enhanced for patients with high levels of 12-step mutual help participation (Bergman, Hoepfner, Nelson, Slaymaker, & Kelly, 2015; Groh, Jason, Ferrari, & Davis, 2009) and the effects could be additive contributors to continued abstinence (Majer, Jason, Aase, Droege, & Ferrari, 2013).

Jason and colleagues (2015) conducted an RCT with individuals released from the criminal justice system and found the Oxford House condition achieved the highest alcohol sobriety rates, and when compared to therapeutic communities, Oxford House residents received more money from employment and worked more days. Cost-benefit ratios favored Oxford House over therapeutic communities or standard continuing care. Women involved with the criminal justice system who participated in a quasi-experimental study (Jason, Salina & Ram, 2016) were found to have similar outcomes on substance use, employment, and arrests, although fewer deaths were noted in the Oxford House condition relative to standard continuing care. In a quasi-experimental design that compared the effects of a traditional Oxford House to a culturally modified Oxford House (Jason, DiGangi, Alvarez, Contreras, Lopez, Gallardo, & Flores, 2013), Latino residents had a sharper decrease in alcohol use in the traditional home; however, had a sharper increase in income in the modified home. In a quasi-experimental cross-sectional study (Majer, Jason, & Olson, 2004) that compared Oxford House residents who attended twelve-step groups to twelve-step members who had never lived in an Oxford House, found that among participants who reported having less than 180 days abstinent, Oxford House residents reported greater abstinent self-efficacy.

Similar to Oxford Houses, other research has tested the effectiveness of offering recovery housing based on similar governing principles such as providing abstinent-contingencies and being self-sustaining. In an RCT, Tuten and colleagues (2012) recruited patients who completed medicated assisted opioid detoxification and found that both the recovery housing condition, and the recovery housing plus reinforcement-based therapy (RBT) produced comparably higher abstinence rates than continuing care. A quasi-experimental design (Tuten et al, 2017) later showed that individuals who accessed recovery housing, irrespective of whether it was provided as part of the intervention (RBT with recovery housing) or obtained on their own (RBT without recovery housing), had better abstinence and employment outcomes than those who did not access recovery housing.

It is challenging to find a clear definition in the literature that differentiates residential recovery homes from halfway houses (see Borkman et al., 1996). Many halfway houses are different from recovery homes as they are more likely to incorporate treatment components with professional staff and have time limited residencies. In a quasi-experimental study, veterans who were discharged to a halfway house instead of community-based living arrangements had increased outpatient treatment retention and completion rates (Hitchcock et al, 1995). In a 1995 study, Ross found no difference in alcohol use at 12 months among veterans who completed inpatient treatment and were assigned to either domiciliary care or the community using a quasi-experimental design. Annis et al, (1979) also reported no difference in episodes of “drunkenness” when comparing matched controls referred and not referred to a halfway house after detoxification. No differences in drinking, interpersonal health, or vocational health were

reported by Pattison et al, (1969) when using a quasi-experimental design to examine outcome differences among individuals recruited from a halfway house, private medical hospital, and mental health outpatient clinic while receiving treatment for alcohol use.

3.5.3. Quality of Existing Evidence and Implications for Future Research on Recovery Residencies

The scientific rigor on recovery residencies is viewed as moderate. Evaluations of recovery residencies on which conclusions can be drawn are based on 10 quasi-experimental designs and tempered by the fact that the 10 RCT papers identified represent only 3 distinct original RCT studies (Tuten et al, 2012; Jason et al, 2006; Jason, 2015). Two of the RCTs had an active comparison (Tuten et al, 2012; Jason, 2015) and the other RCT had a comparison determined by the participant so only a subset attended a treatment or recovery orientated environment (Jason, 2006). There is a need for more research on the various types of recovery residence models and with greater specificity. For example, we need to understand which recovery home characteristics are associated with optimal lengths of stay and how social networks help socially integrate residents (Polcin, 2016). Given the very promising results from available rigorous trials, there is a need also for more research on cost-effectiveness so policy makers can make funding decisions using economic information. Additional research is needed on how to better service post-incarcerated women with substance use disorder using recovery residencies. The funding of substance use disorder treatment has changed with the passage of the Mental Health Parity and Addiction Equity Act and the Affordable Care Act ([McLellan & Woodworth, 2014](#)) so acute-care approaches to substance use disorder treatment need to expand into a more recovery-oriented system of care but funding barriers remain (Laudet & Humphreys, 2013).

3.6 Clinical Models of Continuing Care

3.6.1. Origin, Nature, Scope and Purpose

In order to shorten the course of SUD and to facilitate a positive SUD recovery trajectory, scientific and health policy experts recognize the need to treat SUD within a chronic disease management framework similar to diabetes, cancer, and asthma as the general consensus (Compton, Glantz, & Delany, 2003; McLellan, McKay, Forman, Cacciola, & Kemp, 2005). Poor SUD outcomes can result in additional disease, disability, or death, though estimates suggest that 60% of individuals with SUD will ultimately achieve full-sustained remission (White, 2012). After any given SUD treatment episode, however, 40-60% will relapse within 1 year after discharge (Hunt, Barnett, & Branch, 1971; Witkiewitz & Masyn, 2008). SUD relapse risk remains elevated through 5 years of remission for alcohol use disorder (Dennis, Foss, & Scott, 2007; Dennis, Scott, Funk, & Foss, 2005) and possibly beyond 5 years for opioid use disorder (Hser, Evans, Grella, Ling, & Anglin, 2015). Prior to establishing full sustained remission, individuals often seek multiple episodes of treatment, and may cycle through periods of short-term remission, relapse, and even incarceration (Scott, Foss, & Dennis, 2005).

The contextualization of SUD as a chronic illness has a long history in the treatment field, initially forming around the "disease concept" framework of Alcoholics Anonymous (AA) and other 12-step mutual-help organizations (MHOs) (White, 2014). While it is a long-standing practice for SUD clinicians to encourage participation in "aftercare" (less intensive treatment after an index episode of care) and in non-professional, 12-step MHOs, many now consider these post-treatment activities as essential, reflected in the field's linguistic shift from "aftercare" to

“continuing care” (CC; which is how we refer to these post-treatment services hereafter). In addition to a paradigm shift in concept, clinical models of long-term recovery management have been extended in duration over time (Dennis, Scott, & Funk, 2003; Dennis & Scott, 2012), while also building on major technological changes in how we communicate and socialize.

In the following section, we report results, and clinical and policy implications, from a systematic review of clinical models of long-term recovery management. Given that far more is known scientifically about shorter-term CC interventions delivered face-to-face (F2F) or by telephone among adults (Blodgett, Maisel, Fuh, Wilbourne, & Finney, 2012; McKay, 2009), we devote greater attention to newer modalities of post-treatment recovery management (e.g., digital platforms), less intensive interventions provided over a longer period of time (e.g., “recovery management checkups”), and studies that focus on youth CC outcomes (e.g., assertive continuing care).

3.6.2. Clinical Models of Continuing Care – Review of the Research

To be eligible for the review, studies had to examine a CC or long-term recovery management intervention delivered subsequent to an index treatment episode, where participants were assessed at least 1 year from initial date of intervention or treatment discharge. For a cross-sectional or qualitative study to be included, the data needed to have been collected at least 1 year from initial date of intervention (e.g., semi-structured interviews 1 year or more from the first day of receiving the CC intervention). Database searches in PubMed, Embase, PsycInfo, CINAHL, and CENTRAL resulted in 5,398 citations, and 1,968 after duplicates were removed. Of these 1,968, 1,448 were removed after scanning article titles. Reasons for removing citations included: a) lack of relevance to the review topic (e.g., continuing care of another chronic illness such as cancer), b) study was not an original, scientific article from an academic, peer-reviewed journal (e.g., dissertation or editorial), or c) the study was not in English and a translated version was not readily available. We then reviewed abstracts of the remaining 520, after which 429 were excluded and 57 were included, followed by a full-text scan of 23 to determine inclusion vs. exclusion. Many of these 429 excluded articles examined other forms of recovery management (e.g., recovery residences, which are covered elsewhere in this report), CC interventions where assessments did not extend to 1 year, or factors that predict engagement with CC but not CC outcomes. After the full-text scan, a further nine citations were included, resulting in 66 total studies meeting inclusion criteria. We located two further studies meeting criteria from the reference sections of included studies, and decided to include an additional two studies that focused on CC among youth, despite follow-up assessments only extending to 9 months, resulting in a final total of 70 studies (Appendices A and B).

Of these 70 studies, 37 were RCTs, eight were quasi-experimental, 23 were single-group prospective studies, and three were single-group retrospective studies (e.g., longitudinal but using a chart review as a primary mode of data collection). Given that RCTs offer the most rigorous tests of the efficacy of CC and long-term recovery management interventions, we focus here on those 37 studies. Table 1f provides a summary of study details and primary results.

Findings are organized as a function of CC versus long-term recovery management as well as intervention modality: 1) CC delivered F2F; 2) CC delivered by telephone, 3) CC delivered by digital platform, and 4) long-term recovery management.

Continuing care – face-to-face (F2F) delivery

The review yielded 17 published articles on F2F Continuing Care, from 16 unique study samples. Among adults, results suggested F2F CC interventions may promote modest, albeit

inconsistent, benefit on alcohol and other drug outcomes compared to usual continuing care (UCC) (Bennett et al., 2005; Bowen et al., 2014; O'Farrell, Choquette, & Cutter, 1998; Sacks et al., 2011; Sannibale et al., 2003). It is important to note that while content of UCC sessions varies among studies (i.e., due to different clinical settings), it is typically delivered in group format, with a focus on helping individuals cope with recovery-related challenges while encouraging 12-step MHO participation. Given that group CC may be as effective as individual CC (Graham, Annis, Brett, & Venesoen, 1996), it is not necessarily surprising that in some cases UCC performs as well as the CC intervention of interest (McKay et al., 1999; McKay et al., 2010a). Finally, in several studies, individuals receiving active CC comparators (e.g., 12-step facilitation or interaction therapy) did as well, or better than, those who received the CC intervention of interest (Cooney, Kadden, Litt, & Getter, 1991; Project MATCH, 1997; McKay et al., 2010a). Finally, evaluations of "contracting" approaches, intended to enhance participation in UCC and thereby improve outcomes over time, revealed mixed outcomes (Ahles, Schlundt, Prue, & Rychtarik, 1983; Lash et al., 2013; Lash et al., 2007).

Among adolescents (e.g., 12-18 years), Godley, Godley and colleagues (Godley, Godley, Dennis, Funk, & Passeti, 2007; Godley et al., 2014; Godley et al., 2010) evaluated Assertive Continuing Care (ACC) in a series of randomized trials. ACC combines case management with individual counseling based on the Adolescent Community Reinforcement Approach (A-CRA), which facilitates interpersonal skill development and helps link patients with pro-social activities (e.g., recovery-related or otherwise healthy and adaptive). Two studies of adolescents who attended residential SUD treatment (Godley et al., 2007; Godley et al., 2014) showed that ACC is a helpful addition to UCC (with small to moderate incremental benefit). ACC plus Contingency Management (targeting both substance use and prosocial activities), however, did no better than UCC. Among those who attended a manualized, outpatient SUD treatment program or received 7-session motivational enhancement therapy/cognitive-behavioral therapy (MET/CBT 7) (Godley et al., 2010), adding ACC to either primary intervention did not improve outcomes and MET/CBT 7 without ACC was the most cost-efficient approach to promote 12-month "recovery" (i.e., 30-day abstinence, no substance use problems, and living in the community).

For whom do these interventions work best? In addition to positive results of ACC among adolescents who attended residential, but not outpatient, treatment, several other studies have shown CC may work best for individuals with more severe clinical profiles. McKay et al. (1999), for example, showed that a relapse prevention CC intervention only reduced heavy drinking days compared to UCC for individuals with the more severe alcohol dependence, and increased cocaine abstinence days only for those with an abstinence goal.

Continuing care – telephone delivery

The review yielded 12 published articles on telephone-delivered CC, from eight unique samples. Telephone CC for adults appears to be as, or more, effective than F2F CC, including UCC and other "active" CC interventions with small to moderate benefit (McKay, Lynch, Shepard, & Pettinati, 2005a; McKay et al., 2004; McKay et al., 2011a; McKay et al., 2010b; McKellar et al., 2012), though not in all cases (McKay et al., 2013). Supportive telephone CC interventions without an articulated mechanism of change may not provide incremental benefit (Fitzgerald & Mulford, 1985), and any observed telephone CC benefit may decay once the intervention concludes (McKay et al., 2011b). It is critical to note that, while benefit may be only modest, studies have shown telephone CC interventions to be cost-effective relative to UCC, ultimately reducing the total financial burden to society and the individual by an additional \$750-

800 per patient per year (McCollister, Yang, & McKay, 2016; Shepard, Daley, Neuman, Blaakman, & McKay, 2016). Among adolescents, five sessions of either F2F or telephone CC may offer little to no benefit after outpatient CBT for alcohol use disorder (Burleson, Kaminer, & Burke, 2012).

For whom do these interventions work best? Individuals with greater clinical severity/risk may be poorer candidates for telephone CC delivered over a brief period of time compared to F2F CC (McKay, Lynch, Shepard, & Pettinati, 2005b; McKay et al., 2004). Those with severe clinical profiles (e.g., more network support for drinking and recent substance use upon CC initiation), however, may benefit the most from intensive telephone CC interventions delivered over extended periods (e.g., 2 years) (McKay et al., 2013; McKay et al., 2011b; McKay et al., 2010b).

Continuing care – digital technology-assisted delivery

The review yielded three studies of digital CC, one of which tested the incremental benefit of adding a smartphone application to UCC after residential SUD treatment (Gustafson et al., 2014), one of which tested a mobile text-message intervention against UCC for adolescents and emerging adults (12-25 years) who received residential or outpatient SUD treatment (Gonzales, Hernandez, Murphy, & Ang, 2016), and one of which tested Interactive Voice Response (IVR) – an *automated* CC intervention delivered by telephone – against UCC for adults with lifetime alcohol dependence who received 8-12 outpatient sessions of CBT (Rose, Skelly, Badger, Ferraro, & Helzer, 2015). While the IVR CC intervention did no better than UCC on both alcohol abstinence and non-heavy drinking (Rose et al., 2015), the mobile CC interventions yielded promising results. The smartphone application-based Addiction-Comprehensive Health Enhancement Support System (A-CHESS) integrates with clinical monitoring while providing easy access to relapse prevention resources (e.g., relaxation audio) and use of GPS-based geofencing to safeguard against entering areas that might induce craving and heighten relapse risk (e.g., an area where there's a frequented bar). Based on the 30 days before the 12-months post-treatment assessment, in addition to their benefit (of small magnitude) on non-heavy drinking days, the odds of abstinence for individuals receiving UCC plus A-CHESS were 65% greater than UCC alone (Gustafson et al., 2014). Among adolescents and emerging adults, Gonzales et al. (2016) showed that, compared to UCC, odds of abstinence from one's primary substance was 30% higher, and abstinence self-efficacy 35% higher, up to 9 months after receiving a 12-week, daily mobile text-messaging monitoring, feedback, and psychoeducation intervention.

For whom do these interventions work? There were no studies or analyses on moderators of digital CC effects.

Long-term recovery management

There were four studies on Recovery Management Checkups (RMCs) (Dennis et al., 2003; Dennis & Scott, 2012; McCollister et al., 2013; Scott & Dennis, 2009), designed to respond to the chronic nature of the recovery process by checking-in with patients on a quarterly basis, and using a motivational assessment approach, to actively link patients in need back to treatment. Two studies showed RMCs provide modest, but reliable benefit compared to assessment-only across a host of recovery outcomes including less treatment need (recent use, problems, or subjective need) over time, sooner return to treatment when in need, more adequate doses of treatment (e.g., 7+ days of outpatient), and more abstinent days (Dennis et al., 2003; Dennis & Scott, 2012). Importantly, RMCs incur similar societal and intervention-related costs compared to assessment-only over time, while producing better outcomes, highlighting these long-term recovery management approaches as more cost-efficient as well (McCollister et al., 2013).

For whom do these interventions work best? Like CC models, individuals with more complex and severe clinical profiles (e.g., history of criminal justice involvement and substance onset prior to age 15) may derive the most benefit from RMCs (Dennis & Scott, 2012).

3.6.3. *Quality of Existing Research, Implications, and Agenda for Future Research*

Quality of Existing Research. The scientific rigor of research on clinical models of long-term recovery management is strong. Evaluations of CC and RMCs on which conclusions can be drawn are based largely on RCTs and quasi-experimental studies (the latter of which are not discussed here). Furthermore, these approaches are most often tested against active comparison conditions, which, at a minimum similarly mobilize common therapeutic factors and also strongly encourage 12-step MHO attendance. In the Clinical Trials Network series of investigations, for example, interventions previously shown to be efficacious when tested against inert (or minimally active) comparators, are often no more effective than good quality, structured, TAU— which naturally also tend to mobilize common therapeutic factors and increase 12-step MHO participation (Wells, Saxon, Calsyn, Jackson, & Donovan, 2010). Furthermore, examinations of assessment reactivity in SUD research suggest intensive regular scientific measurement— as is often the case in CC and RMC studies — may help boost outcome (Clifford & Davis, 2012). Taken together, the scientific literature reviewed here which shows modest (at best) benefit provided by CC and RMCs may be an underestimate of the actual benefit individuals would receive from such interventions in the real world.

Implications for the Field. 1) Use a chronic illness disease management framework. Given the chronicity of SUD relapse risk, and the need for ongoing recovery management, models with longer duration may offer more recovery-related benefit. While Blodgett et al.'s meta-analysis (2014) did not support moderation by CC duration, studies virtually always assess individuals well after individuals are no longer receiving the CC intervention, and show a decay of benefit after the CC intervention is removed. The arbitrary termination of care — particularly in the first several years — may be mismatched with a true, chronic disease management framework (Compton et al., 2003; McLellan et al., 2005). 2) Not every patient will need professional assistance as part of their long-term recovery management plan. Despite only modest benefit overall, patients with more severe clinical profiles appear to benefit the most from CCs and RMCs. For those with lower severity, simpler CC plans (e.g., weekly group therapy) or 12-step MHO participation alone may offer sufficient recovery support. 3) Keep it simple. Adding CM to a complex CC intervention does not appear to provide any added benefit, and may actually do worse compared to a CC intervention alone — particularly when the CM also targets recovery-related activities or CC attendance. The exact reasons for this are unclear, though one might speculate providing monetary or other reinforcement for recovery-related activities may mute an organic enhancement of internal motivation to engage in these activities, resulting in stunted motivation once reinforcement is withdrawn (Litt, Kadden, Kabela-Cormier, & Petry, 2009). Also, requiring engagement at multiple clinical sites as part of long-term recovery management may also be counter-therapeutic (McKay et al., 2013).

Agenda for Future Research. 1) Digital mobile platforms may provide low-burden opportunities to extend recovery management frameworks over time. The ubiquity of smartphone and text-messaging technology in the United States (Pew Research Center, 2015) can help make SUD recovery support available, accessible, and convenient. The positive findings among both youth (Gonzales et al., 2016) and adults (Gustafson et al., 2014) renders technology-assisted recovery management even more intriguing, though key questions remain about which mechanisms of health behavior change digital frameworks should ideally try to mobilize, and

how best to combine digital and F2F approaches. 2) We still know very little about how these approaches work. As highlighted by McKay (2009), there remain many questions about how CCs and RMCs exert their effects. A better understanding of their mechanisms of action might help lead to enhancements that can be honed and ultimately boost outcomes. For example, youth CC interventions (Godley et al., 2007; Gonzales et al., 2016) target modifications to their social network – including but not limited to 12-step MHO engagement – yet whether they work by mobilizing network changes has not been formally tested. 3) Building on non-clinical models of long-term recovery management. The evidence for non-clinical models of long-term recovery management is compelling, including 24/7 Sobriety (https://www.rand.org/pubs/external_publications/EP51155.html) and the Physician's Health Program (DuPont, McLellan, White, Merlo, & Gold, 2009). These programs which exploit CM principles to promote abstinence – have produced very positive results. Future research might examine how to apply lessons learned from these studies to clinical situations with less natural leverage to affect change. For example, the Community Reinforcement and Family Training model has shown that CM principles can be mobilized by family members to facilitate their loved one's engagement in treatment (Meyers, Miller, Smith, & Tonigan, 2002; Miller, Meyers, & Tonigan, 1999). Future studies might test whether family members and friends may also be vehicles to help their loved ones initiate and sustain recovery over the long-term.

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TABLE 1: TABULARIZED SUMMARY OF THE EVIDENCE ON SIX RECOVERY SUPPORT SERVICES
IN THE UNITED STATES

Table 1A: Peer-based recovery support services

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Bernstein et al., 2004	Randomized controlled trial	Exp: A single, structured encounter targeting cessation of drug use, conducted by peer educators in the context of a routine medical visit. Con: Written advice only.	Out of treatment adults with past 90-day cocaine and/or heroin use attending hospital walk-in clinic.	$N = 1,175$ (F= 29%, M= 71%)	3 and 6 months	66%	Multi-substance	Compared to controls, at 6-month follow-up, participants receiving a brief peer-support intervention were more likely to be abstinent from cocaine, and trended toward greater heroin, and both cocaine and heroin abstinence ($p = .05$). A trend was also observed in bioassay measured cocaine use, but not heroin use. No group differences were noted in detox or treatment admissions among those who were abstinent. Those receiving the peer-support intervention demonstrated a trend toward greater reductions in Addiction Severity Index drug subscale and medical severity scores ($p = .06$).
Rowe et al., 2007	Randomized controlled trial	Exp: A community-oriented group intervention with citizenship training and peer support combined with standard clinical treatment, including jail diversion services. Con: Standard clinical treatment with jail diversion services only.	Adult outpatients with severe mental illness who had criminal charges within the two years prior to study enrolment, 31% with alcohol use disorder, 42% with other SUD.	$N = 114$ (F= 32%, M= 68%)	6, and 12 months	61%	Multi-substance	Four months of 'Citizenship Training' geared toward social participation and community integration + peer mentorship, and standard clinical treatment including jail diversion services, produced reduced alcohol use over 12-month follow-up, while those receiving standard clinical treatment with jail diversion services alone demonstrated increased drinking over the same period. Both groups demonstrated significantly less non-alcohol drug use and fewer criminal justice charges over the 12-month follow-up period.

Tracey et al., 2011	Randomized controlled trial	<p>Exp: 1) Mentorship for Addictions Problems to Enhance Engagement to Treatment (MAP-Engage): A peer-driven intervention with open-ended individual peer contact and peer-led groups. Peers escort patients to first outpatient program.</p> <p>2) Dual Recovery Treatment + MAP-Engage: Dual Recovery Treatment is an intervention involving 8 weeks of clinician-delivered individual and group relapse prevention therapy.</p> <p>Con: Treatment as usual only.</p>	Adult inpatients at Veteran's Administration with high hospitalization recidivism and current and/or past diagnosis of SUD, and two or more past-year hospitalizations. 88% had current alcohol or other SUD in addition to psychiatric comorbidity.	<i>N</i> = 96 (F= 3%, M= 97%)	12 months	100%	Multi-substance	Compared with treatment as usual alone, MAP-Engage, and MAP-Engage + Dual Recovery Treatment were both associated with greater post-discharge, outpatient substance use treatment attendance, general medical, and mental health services appointment adherence, and greater utilization of inpatient substance use treatment services.
Blondell et al., 2008	Quasi-experiment	<p>Exp: A single, 30-60 minute session in which peers in SUD recovery share their personal experience with patients to provide emotional support, enhance motivation to maintain abstinence, and encourage the patient to attend inpatient treatment and/or mutual aid support group attendance after detoxification discharge.</p> <p>Con: No peer intervention.</p>	Patients, hospitalized for alcohol and other drug detoxification.	<i>N</i> = 119 (F= 25%, M= 75%)	1 week	83%	Multi-substance	Participants who received a single, 30-60 minute peer counseling session were more likely to report that they had attended self-help group meetings during the first week following detoxification discharge. Trends were also observed: those receiving peer counseling were more likely to remain abstinent from all substances, and also initiate professional aftercare treatment.
Boisvert et al., 2008	Quasi-experiment	Exp: Peer Support Community Program: In a long-term supportive housing community, select individuals are taught to help govern the community and provide ongoing psychosocial support to fellow residents. The Peer Support Community Program aims to help clients maintain	Adults living in permanent supportive housing following inpatient SUD treatment. 100% had a current SUD, 17% had a co-occurring mental illness.	<i>N</i> = 18 (participants' sex not specified)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 months	12.5%	Multi-substance	Pre- to post-intervention, participants in the Peer Support Community Program reported more emotional, informational, tangible and affectionate support. Participants in the Peer Support Community Program also had lower relapse rates over the study period compared to a sample of residents living

		abstinence from alcohol and other drugs, and remain in housing, thereby transitioning out of homelessness.						in the permanent supportive housing setting the year prior to instigation of the peer-support program.
		Con: A sample of residents living in the same long-term supportive housing community the year prior to instigation of the peer-support program.						
Boyd et al., 2005	Single-group prospective	12 sessions of peer counseling providing psychoeducation about SUD and emotional and informational support to enhance motivation to change substance use behaviors and develop coping strategies for HIV.	Women with HIV living in rural areas. 100% had substance use problem based on Michigan Alcoholism Screening Test and Drug Abuse Screening Test scores.	$N = 13$ ($F = 100\%$)	12 weeks	100%	Multi-substance	No inferential analyses were conducted due to the small sample size. Results however suggest a 12-week peer counseling intervention for substance use may increase participants' recognition that their alcohol and other drug use is problematic, and increase desired change behaviors.
Armitage et al., 2010	Single-group retrospective	Recovery Association Project: A community peer recovery service based on leadership training for civic engagement of people in recovery, leading to a range of public and civic involvement among peers.	Adults in recovery from SUD.	$N = 152$ ($F = 39\%$, $M = 61\%$)	6 months	96%	Multi-substance	At 6-month assessment, 86% of clients who had participated in the peer-driven Recovery Association Project Initiative indicated no use of alcohol or drugs in the past 30 days, and another 4% indicated reduced use (pretreatment data not reported). 95% reported strong willingness to recommend the program to others, 89% found services helpful, and 92% found materials helpful.
Blondell et al., 2008	Quasi-experiment	Exp: A single, 30-60 minute session in which peers in SUD recovery share their personal experience with patients to provide emotional support, enhance motivation to maintain abstinence, and encourage the patient to attend inpatient treatment and/or mutual aid support	Patients, hospitalized for alcohol and other drug detoxification.	$N = 119$ ($F = 25\%$, $M = 75\%$)	1 week	83%	Multi-substance	Participants who received a single, 30-60 minute peer counseling session were more likely to report that they had attended self-help group meetings during the first week following detoxification discharge. Trends were also observed: those receiving peer counseling were more likely to

		group attendance after detoxification discharge.						remain abstinent from all substances, and also initiate professional aftercare treatment.
		Con: No peer intervention.						
Sanders et al., 1998	Cross-sectional	Exp: Peer-led counseling providing comprehensive case management including counseling, support groups, and assistance with housing, transportation, parenting, nutrition and child welfare. Con: Counseling from traditionally trained addiction counselors.	Pregnant and postpartum women in recovery from crack cocaine addiction.	<i>N</i> = 56 (<i>F</i> = 100%)	N/A	N/A	Crack cocaine	Clients receiving ongoing counseling from a peer-counselor, compared to clients receiving counseling from traditionally trained addiction counselors were more likely to describe their counselors as empathic, to identify them as the most helpful aspect of the program, to utilize other clinic resources, and to more strongly recommend their program.
Min et al., 2007	Cross-sectional	The Friends Connection Program: A community-based program in which participants are paired with a peer who has successfully achieved alcohol and other drug abstinence and is successfully coping with their mental health issues. Peer-supports and clients meet approximately once a week for an average of 2 to 5 hours to engage in a variety of community-based activities, including leisure and recreational activities, attend self-help groups, and/or spend time talking. Con: A comparable community sample of individuals who did not participate in the Friends Connection Program.	Adults identified by the City of Philadelphia that have a history of frequent, long-term, psychiatric hospitalizations. 100% had current alcohol or other SUD in addition to psychiatric comorbidity.	<i>N</i> = 484 (<i>F</i> = 35%, <i>M</i> = 65%)	N/A	N/A	Multi-substance	Compared to a demographically and diagnostically concordant comparison group, participants in the Friends Connection Program had longer periods of living in the community without rehospitalization, and a lower overall number of rehospitalizations over a 3-year monitoring period.
Deering et al., 2010	Cross-sectional	Exp: The Mobile Access Project Van: A peer-based mobile service providing a safe place for female sex-workers to rest and eat, and	Female sex-workers who use alcohol and other drugs.	<i>N</i> = 242 (<i>F</i> = 100%)	N/A	N/A	Multi-substance	Women were more likely to utilize the Mobile Access Project Van if they were at higher risk (i.e., seeing <10 clients per week, and/or

		for staff to provide peer-support, condoms and clean syringes, while also acting as a point of contact for referrals to health services.						working isolated settings; injecting cocaine or injecting/smoking methamphetamine in past 6 months), and were also more likely to access the intervention's drop-in center. Past 6-month use of the peer-led outreach program was also associated with a four-fold increase in the likelihood of participants utilizing inpatient SUD treatment including detox and residential SUD treatment.
		Con: A comparable sample of female sex-workers who did not participate in the Friends Connection Program.						
Laudet et al., 2016	Cross-sectional	Students residing in college recovery housing at 29 US universities.	College students in recovery from SUD.	N = 486 (F= 43%, M= 57%)	N/A	N/A	Multi-substance	Sober on average 3 years at the time of the survey, a third of the sample stated they would not be in college were it not for a collegiate recovery program. Top reasons for joining a collegiate recovery program included need for peer recovery support, and wanting to stay sober in the college environment, which is typically not conducive to SUD recovery.

Table 1B: Recovery community centers

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Haberle, Conway, Valentine, Evans, White & Davidson, 2014	Single-group prospective	Use of RCC	RCC participants	N = 385 (F = 50%, M = 50%)	6 months	6%, combined recruitment and retention rate from overall population	Any	<ul style="list-style-type: none"> • Stability on abstinence and mental health symptoms • Increases on independent living conditions (53% owning/renting vs. 30%), employment (22% full-time vs. 10%; 16% part-time vs. 11%), income (41% vs. 21% from wages)
Mericle, Cacciola, Carise & Miles, 2014	Single-group prospective	Use of RCC	RCC participants	N = 290 (F = 34%, M = 66%)	6 months	90%	Any	<ul style="list-style-type: none"> • Less likely to use substances at 6-month follow-up (OR=0.5 for alcohol, 0.4 for drugs) • Gains in employment status (5% vs. 14%)
Armitage, Lyons & Moore, 2010	Single-group prospective	Use of RCC	RCC participants	N = 55 (F = not reported, M = not reported)	6 months	Not reported	Any	<ul style="list-style-type: none"> • 86% reported being abstinent from alcohol and drugs • High service satisfaction, with 89% rating services as helpful and 92% rating provided materials as helpful

Table 1C: Recovery supports in educational settings

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Bell et al., 2009	Qualitative	Collegiate recovery program	Students in a collegiate recovery program at a public university	N = 15 (F = 20%, M = 80%)	None	N/A	Alcohol (26.7%), other drugs (20%), both alcohol and other drugs (53.3%)	Most helpful for CRP students: 12-step meetings on campus, peer-support network, staff supports, designated academic advisors, and physical space to gather
Botzet, Winters, & Fahnhorst, 2007	Single-group prospective; cross sectional	Collegiate recovery program	Recovery high school students (current and alumni)	N = 20 (F = 35%, M = 65%); N = 83 (F = 35%, M = 65%)	6 months; None	Not reported	Not reported	Only 2.2% of current students and 21.6% of alumni reported using any alcohol or drugs in the past 6 months There were no differences in any outcome variables at follow-up
Cleveland & Harris, 2010	Single-group prospective	Collegiate recovery program	Students in a collegiate recovery program at a public university	N = 55 (F = 29%, M = 71%)	None	91.7%	Alcohol (19.2%), other drugs (80%), food (1.8%)	Greater cravings and negative affect are associated with more recovery-focused conversations outside of the CRP
Cleveland, Harris, Baker, Herbert, & Dean, 2007	Cross-sectional	Collegiate recovery program	Students in a collegiate recovery program at a public university	N = 82 (F = 38%, M = 62%)	None	N/A	Alcohol (37%) and other drugs (63%)	82.5% of students reported a GPA above 2.75
Lanham & Tirado, 2011	Cross-sectional	Recovery high school	Recovery high school graduates	N = 72 (F = 58.3%, M = 41.7%)	None	N/A	Not reported (Alcohol and other drugs)	39% of students reported no drug or alcohol use in the past 30 days. More than 90% of students reported enrolling in college.
Laudet, Harris, Kimball, Winters, & Moberg, 2015	Cross-sectional	Collegiate recovery program	Students from 29 collegiate recovery programs	N = 486 (F = 42.8%, M = 57.2%)	None	N/A	Alcohol (38.9%), other drugs (52.6%), behavioral addictions (7.1%), "other" (1.3%)	Only 5.4% of students reported drinking alcohol or using drugs in the past month. 1 in 6 students reported also being in recovery from a behavioral addiction
Laudet, Harris, Kimball, Winters, & Moberg, 2016	Cross-sectional	Collegiate recovery program	Students from 29 collegiate recovery programs	N = 486 (F = 43%, M = 57%)	None	N/A	Alcohol (42%) and other drugs (58%)	On average, participants had not used drugs in 35 months (SD = 32) or alcohol in 31.7 months (SD = 32.2)
Moberg & Finch, 2008	Cross-sectional	Recovery high school	Students from 17 recovery high schools	N = 321 (F = 46%, M = 54%)	None	N/A	Alcohol and other drugs	Reports of weekly alcohol and illicit substance use decreased from 90% in the 12 months

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
								prior to admission, to 7% since admission (based on retrospective reports)

Table 1D: Mutual-help organizations

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Blondell et al. (2011)	RCT	E1: 1 45-60 minute session of individual, peer-delivered TSF + TAU E2: 1 45-60 minute session of clinician-delivered MET + TAU C: TAU	Adults in an inpatient alcohol detoxification program	N = 150 (F=35%, M=65%)	7, 30, 90 days	81%	Alcohol	No difference between TSF, MET, and TAU on PDA, % that relapsed to alcohol or drugs, number of heavy drinking days, % drinking heavily
Bogenschutz et al. (2014)	RCT	E: 12 sessions of individual TSF + TAU C: TAU	Outpatients in a Dual Diagnosis Program	N = 121 (F=48%, M=52%)	4, 8, 12 weeks during treatment 6, 9, 12 months	77%	Alcohol	No difference between TSF and TAU conditions on PDA, DPDD, alcohol abstinence
Brown et al. (2002)	RCT	E: 10 sessions of group TSF C: 10 sessions of group RP	Adults leaving inpatient programs (3 sites)	N = 266 (F=31%, M=69%)	Post-treatment, 6 months	49%	Not specified	No difference between TSF and RP on ASI Alcohol or Drug scales, days to first lapse/relapse
Carroll et al. (2012)	RCT	E: 12 sessions of Individual TSF + TAU C: TAU	Adults in methadone maintenance program	N = 112 (F=41%, M=59%)	Post-treatment, 60 weeks	93%	Cocaine	TSF produced higher PDA from cocaine and more cocaine negative urine screens vs. TAU; no effect of TSF on alcohol use
Donovan et al. (2013)	RCT	E: 8 sessions of group & individual TSF + TAU C: TAU	Adults in outpatient treatment at 10 community-based treatment programs	N = 471 (F=59%, M=41%)	Mid-treatment, post-treatment, 3, 6 months	70%	Stimulants	TSF produced greater likelihood of abstinence from stimulants during treatment (ORs: 2.44-3.34) vs. TAU; Ps in TSF who were not abstinent used stimulants

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
								more during treatment than Ps in TAU
Hayes et al. (2004)	RCT	E: 48 sessions of group & individual TSF + TAU C1: 48 sessions of group & individual ACT + TAU C2: TAU	Adults in 3 methadone maintenance programs who had used opiates in past 30 days	N = 138 (F=51%, M=49%)	Mid-treatment, post-treatment, 9 months	50%	Opioids	No difference between TSF and TAU in self-reported or biologically verified opiate use
Kelly et al. (2017)	RCT	E: 10 sessions of group and individual TSF C: 10 sessions of group and individual MET/CBT	Adolescents recruited from the community	N = 59 (F=27%, M=73%)	Mid-treatment, 3, 6, 9 months	75%	Cannabis	No difference between TSF and MET/CBT on PDA; TSF produced reduced consequences vs. MET/CBT over time ($d = 0.26-0.71$)
Litt et al. (2009)	RCT	E1: 12 sessions of individual TSF E2: 12 sessions of individual TSF + CM C: Individual case management	Adults recruited from the community	N = 210 (F=42%, M=58%)	3, 6, 9, 12, 15, 18, 21, 24, 27 months	82%	Alcohol	TSF produced greater PDA ($d = .28$) and higher rates of continuous abstinence ($d = .30$) than case management or TSF+CM; No difference between conditions on consequences or DPDD
Litt et al. (2016)	RCT	E: 12 sessions of individual TSF C: 12 sessions of individual CBT	Adults recruited from the community	N = 193 (F=34%, M=66%)	3, 9, 15, 21, 17 months	68%	Alcohol	TSF produced greater PDA and fewer consequences (main effects) vs. CBT; No differences on PHDD or DPDD
Lydecker et al. (2010)	RCT	E: 24 sessions of group TSF + pharmacotherapy C: 24 sessions of group CBT for depression-SUD + pharmacotherapy	Veterans with depressive disorders in VA Dual Diagnosis program	N = 206 (F=8%, M=92%)	Mid-treatment, post-treatment, 9, 12, 15, 18 months	66%	Multiple	TSF produced lower PDA vs. CBT

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Kahler et al. (2004)	RCT	E: 1 60-minute MI-TSF session C: 1 5-minute BA-TSF session	Adults in inpatient detoxification program	N = 48 (F=23%, M=77%)	1, 3, 6 months	90%	Alcohol	No difference between MI-TSF and BA-TSF on PDA or DPDD; for participants with prior 12-step experience BA-TSF was better.
Manning et al. (2012)	RCT	E1: 1 30-45-minute peer-delivered TSF session + TAU E2: 1 30-45 doctor-delivered TSF session + TAU C: TAU	Adults in a 10-14 day inpatient program	N = 151 (F=33%, M=67%)	Pre-discharge, 2-3 months	83%	Multiple	Overall, peer was more effective at facilitating mutual-help participation, but doctor was better if patient had no prior experience. No difference in abstinence rates across groups.
Project MATCH Research Group (1997)	RCT	E: 12 sessions of individual TSF C1: 12 sessions of individual CBT C2: 4 sessions of individual MET	Adult recruited from the community or outpatient treatment programs (Outpatient Arm), or following inpatient/day programs (Aftercare Arm)	N = 1726 (F=26%, M=74%)	Post-treatment, 6, 9, 12, 15 months	92%	Alcohol	In aftercare arm, TSF produced greater PDA toward end of follow-up vs. CBT & MET (small ES); no differences in DPDD In outpatient arm, CBT produced lower PDA vs. TSF & MET (small ES)
Timko et al. (2006)	RCT	E: 3 sessions of individual TSF C: 3 sessions of individual standard referral to 12-step	Veterans entering outpatient VA SUD treatment	N = 345 (F=2%, M=98%)	6 months	81%	Multiple	TSF produced more improvement in ASI scores for alcohol and drugs vs. standard referral; increased likelihood of abstinence from drugs (but not alcohol)
Walitzer et al. (2008)	RCT	E1: 12 individual sessions of directive TSF E2: 12 individual sessions of motivational TSF C: 12 individual sessions of CBT	Adults recruited from the community	N = 169 (F=34%, M=66%)	Post-treatment, 6, 9, 12, 15 months	82%	Alcohol	Directive TSF produced greater PDA at 9- and 15-month follow-ups vs. motivational TSF and CBT; No differences in PDH or consequences

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Campbell et al. (2016)	RCT	E: SR meetings + web-based OA C: SR meetings only	SR attendees (in-person or online)	$N = 188$ (F=61%, M=39%)	3, 6 months	70%	Alcohol	No difference between SR + OA and SR only on PDA, DPDD, consequences
Grant et al. (2017)	Quasi-experimental	E: 3 sessions of individual or group TSF C: Standard referral	Veterans entering intensive VA SUD treatment	$N = 195$ (F=9%, M=91%)	6 months	72%	Multiple	No differences in PDA, proportion who were abstinent, or DPDD
Kaskutas et al. (2009)	Quasi-experimental	E: 6 sessions of group TSF C: 6 sessions of standard group 12-step education	Adults seeking treatment at 2 treatment sites	$N = 508$ (F=33%, M=67%)	6, 12 months	76%	Multiple	TSF participants had greater likelihood of abstinence from alcohol and drugs vs. standard condition at 12 months (no difference at 6 months)
Timko et al. (2011)	Quasi-experimental	E: 4 sessions of group TSF C: 1 session of standard referral	Veterans with dual diagnoses entering outpatient VA mental health treatment	$N = 287$ (F=9%, M=91%)	6 months	80%	Multiple	No differences in ASI scores; TSF participants reported fewer psychiatric symptoms and had fewer days of drug use vs. standard referral participants
Humphreys & Moos (2001; 2007)	Quasi-experimental	E: 12-step-based treatment programs (n = 5) C: CBT treatment programs (n = 5)	Veterans in 12-step-based or CBT VA treatment programs	$N = 1774$ (F=0%, M=100%)	12, 24 months	86%	Multiple	Patients treated in 12-step programs were more likely to be abstinent vs. those treated in CBT programs; No differences in substance-related problems, psychiatric distress, psychiatric symptoms

Note: TSF = Twelve-Step Facilitation; TAU = Treatment as usual; PDA = Percent days abstinent; DPDD = Drinks per drinking day; RP = Relapse Prevention; ASI = Alcohol Severity Index; SR = SMART Recovery; OA = Overcoming Addictions; ACT = Acceptance and Commitment Therapy; BA = Brief Advice; MET = Motivational Enhancement Therapy; CBT = Cognitive Behavioral Therapy; CM = Contingency Management; PHDD = Percent Heavy Drinking Days; ASI = Addiction Severity Index; PDH = Percentage of Days Heavy Drinking

^aStandardized as the length of time from baseline assessment

^bPercentage retained at final follow up

Table 1E: Recovery Housing

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Tuten 2017	Quasi-experimental	Exp: Reinforcement-based treatment (RBT) plus recovery housing Con: RBT	Participants from a study of outpatients and participants from one arm of an RCT	$N = 135$ (F=55, M=80), though only $n = 124$ were used for the favorable outcome)	1, 3, and 6-month	90%	Opioids	Similar outcomes on abstinence (both 50% at 6-month) and employment (69% vs. 68% employed at 6-month); Some indication of higher abstinence and employment outcomes in a subsample ($n = 124$) of post-hoc defined groups utilizing recovery housing, either self-paid or study paid compared to no recovery housing.
Jason, Salina et al, 2016	Quasi-experimental	Exp: Oxford House Con 1: usual aftercare arrangements decided by participant	Women formerly incarcerated in the past two years	$N = 200$ (F=100%, M=0%)	6, 12, 18, and 24 months	Exp: 86% Con: 84%	multiple	Similar outcomes on substance use, employment, and arrests; Death rates between the Exp (0) and Con (4) conditions were not tested for significant difference but noted.
Jason et al, 2015	RCT	Exp: Oxford House Con 1: Therapeutic Community Con 2: usual aftercare arrangements decided by participant	Post criminal justice system recruited from substance use disorder treatment facilities or reentry/case management programs	$N = 270$ (F=83%, M=17%)	6, 12, 18, and 24 months	Exp: 82% Con 1: 81% Con 2: 78%	multiple	Continuous abstinence from alcohol over two years was significant between groups: Exp (66%), Con 1 (40%), Con 2 (49%); Money received from employment last month significant between groups: Exp (\$680), Con 1 (\$319), Con 2 (\$579); Number of paid work days last month significant between groups: Exp (11.27), Con 1 (6.37), Con 2 (8.45); Cost to benefit analysis showed net benefit per person: Exp (\$12,738), Con 1 (\$-7,510), Con 2 (\$3);

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
								No significant difference between groups on days using alcohol or other drugs (although Exp and Con 1 both showed reductions over time), continuous abstinence from other drugs, illegal income obtained, legal issues, incarcerations, and psychiatric hospitalizations.
Mueller et al, 2014	RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Post residential treatment	N = 150 (F=62%, M=38%)	6, 12, 18, and 24 months	Exp: 89% Con: 86%	multiple	Number of people in recovery in personal network increased more Exp compared to Con; Number of heavy drinkers in network increased over time in Con but not for Exp.
Jason, 2013	Quasi-experimental	Exp: culturally modified Oxford House Con: traditional Oxford House	Latino completers of a substance use program	N = 120 (F=70, M=50)	6-month	70%	N/A	Exp: Alcohol use decreased by 13.89 days; Income increased by \$733 Con: Alcohol use decreased by 34.82 days; Income increased by \$325
Majer et al, 2013	RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Post residential treatment	N = 150 (F=62%, M=38%)	6, 12, 18, and 24 months	Exp: 89% Con: 86%	multiple	Exp condition 5.6 times more likely to have continuous abstinence over two years compared to Con. 12-step involvement at baseline were 2.8 times more likely to maintain abstinence at 2 years. No significant interaction.
Chavarria 2012	RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Post residential treatment	N = 150 (F=62%, M=38%)	6, 12, 18, and 24 months	Exp: 89% Con: 86%	multiple	Exp condition explained 63% of abstaining at 2 years. Increases in self-regulation explain 2% of abstaining and self-efficacy explains 3%. Interaction was significant but minimal and attenuating (-.1%).

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
LoSasso et al, 2012	Cost-Effectiveness of RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Post residential treatment	N = 129 (F=60%, M=30%)	6, 12, 18, and 24 months	over 90%	multiple	Net benefit of \$29,022 per Oxford resident relative to usual care.
Tuten 2012	RCT	Exp1: recovery housing (RH) Exp2: RH plus reinforcement-based treatment Con: usual care	Patients who completed medication-assisted opioid detoxification	N = 243 (F=25.9%, M=74.1%)	1, 3, and 6-month	Unclear; 77% of urine samples were collected, 85% of follow-up visits were done	Opioids and cocaine	Drug abstinence rates were higher in Exp 1 (50%) and Exp 2 (37%) compared to Con (13%); Length of stay in recovery housing mediated significant effect on drug abstinence.
Jason et al, 2011	RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Post residential treatment	N = 150 (F=62%, M=38%)	6, 12, 18, and 24 months	Exp: 89% Con: 86%	multiple	41% of Exp group with PTSD relapsed by 2 years versus 28% in Con with PTSD. Increased self-regulation among PTSD participants in the Exp condition compared to Con. No significant difference in unemployment rates among those with PTSD in Exp or Con.
Groh et al, 2009	RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Residential substance use disorder treatment	N = 150 (F=62%, M=38%)	6, 12, 18, and 24 months	Exp: 89% Con: 86%	multiple	Exp: Abstinence rates among those with high 12- step involvement in Exp (87.5%) versus Con (31.4%) versus low 12-step involvement in Exp (52.9%) versus Con (21.2%).
Jason et al, 2007	RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Residential substance use disorder treatment	N = 150 (F=62%, M=38%)	6, 12, 18, and 24 months	Exp: 89% Con: 86%	multiple	Exp: any substance use (31.3%), employed (76.1%), awaiting criminal charges (0%). Interaction showed young people who stayed at least 6 months had lower substance use (6.7%) compared to young people who stayed for less than 6 months (62.5%)

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
								Con: any substance use (64.8%), employed (48.6%), awaiting criminal charges (5.6%); Interaction showed awaiting criminal charges for young people (10.8%) relative to older (0%).
Jason et al, 2006	RCT	Exp: Oxford House Con: usual aftercare arrangements decided by participant	Residential substance use disorder treatment	N = 150 (F=62%, M=38%)	6, 12, 18, and 24 months	over 90%	multiple	Exp: 64.8% abstinent, monthly income \$989.40, incarcerated 3% Con: 31.3% abstinent, monthly income \$440.00, incarcerated 9%
Majer et al, 2004	Quasi-experimental	Exp: Oxford House Con: 12-Step members who never lived in Oxford House	Residence at an Oxford House or AA/NA members	N = 84 (F=35%, 65%)	baseline	N/A	multiple	Higher abstinence self-efficacy in Exp compared to Con among individuals with less than 180 days abstinent
Hitchcock et al, 1995	Quasi-experimental	Exp: Halfway House Con: Community-based living arrangements (friends, relatives, independent)	Outpatient treatment at VA following inpatient treatment for substance use disorder	N = 124 (F=0%, M=100%)	Until discharged after 90 days	Exp: almost 66% Con: 26%	multiple	Early dropout from aftercare in Exp (0%) versus Con (0%); Exp condition remained in treatment two months longer; nonsignificant difference in those discharged as treatment complete in Exp (28.2%) versus Con (15.1%)
Ross et al, 1995	Quasi-experimental	Exp: discharge from inpatient treatment to domiciliary Con: discharge to community	veterans who completed inpatient treatment for alcoholism	N = 276	3, 6, 9, and 12-month	91%	Alcohol	No significant group difference at 6, 9 and 12 month
Annis et al, 1979	Quasi-experimental	Exp: referred to halfway house from detox	First admissions to detox centers	N = 70 (F=0%, M=100%)	3 month	100%	Alcohol	No differences between conditions on drunkenness index that combined evidence of drunkenness arrests and detoxification readmission

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		Con: not referred to halfway house from detox						
Pattison et al, 1969	Quasi-experimental	Exp: Halfway House Con: Private medical hospital Con: Mental Health Outpatient Clinic	Patients at three different treatment facilities	N = 45 (F or M=N/A)	Several years after treatment completion	N/A	Alcohol	No group differences in drinking, interpersonal health, or vocational health. Interaction showed abstinent patients show improvement in interpersonal relationships.

Note: Exp=experimental condition, Con = control condition, PTSD = post-traumatic stress disorder, RCT = randomized control trial

Table 1F: Clinical models of continuing care

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Continuing Care (CC) – Face to Face (F2F)								
Ahles et al., 1983	RCT	<p>Exp: Nine standard CC sessions over 6 months plus behavioral contracting for CC session attendance (CC plus Contract; behavioral contract signed and incentives provided by significant other or self for CC attendance)</p> <p>Con: Nine UCC sessions over 6 months (standard scheduling arrangements, including emphasized importance of session attendance)</p>	Male veterans who completed at 28-day inpatient SUD treatment program	<p>$N = 50$ (F=0%, M=100%)</p> <p>Exp: $n = 25$</p> <p>Con: $n = 25$</p>	3 and 12 months after treatment discharge	<p>Overall: 72%</p> <p>Exp: 72%</p> <p>Con: 72%</p>	Alcohol	<p>Monthly Abstinence: 3-month CC plus Contract > UCC; 12-month CC plus Contract > UCC (e.g., 80% vs. 30% at 3m and 60% vs. 25% at 12m)</p> <p>Cumulative Abstinence: CC plus contract > UCC at 3 months; CC plus Contract > UCC at 6 months (end of intervention); CC plus Contract > UCC at 12 months</p>
Bennett et al., 2005	RCT	<p>Exp: 15 sessions of Early Warning Signs Relapse Prevention Training plus UCC (EWSRPT)</p> <p>Con: UCC (access to treatment-unit recreational/social facilities, up to three aftercare support groups per week, and an alcohol-free social club)</p>	Abstinent alcohol dependent patients who recently completed 6-week outpatient SUD treatment and had a history of 2+ relapses	<p>$N = 124$ (F=37%, M=63%)</p> <p>Exp: $n = 62$ (F=47%, M=53%)</p> <p>Con: $n = 62$ (F=27%, M=73%)</p>	4, 8, and 12 months after baseline (initial trial enrollment)	<p>EXP:</p> <p>4 months: 84%</p> <p>8 months: 77%</p> <p>12 months: 89%</p> <p>Con:</p> <p>4 months: 84%</p> <p>8 months: 77%</p> <p>12 months: 81%</p> <p>EXP & CON completion of all 3 follow-ups: 68%</p>	Alcohol	<p>Past-year complete abstinence at 12 months: EWSRPT = UCC</p> <p>Past-year PDA at 12 months: EWSRPT > UCC ($d = .34$)</p> <p>No heavy drinking past year at 12 months (9+ drinks per day for 3 consecutive days): EWSRPT > UCC ($r = .2$)</p> <p>Past-year PDNHD at 12 months: EWSRPT > UCC ($d = .31$)</p> <p>Alcohol-related problems over time: EWSRPT = UCC</p> <p>Quality of life over time: EWSRPT = UCC</p>

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
								Psychiatric Symptoms over time: EWSPT = UCC
Bowen et al., 2014	RCT	<p>Exp: 8 sessions of Mindfulness-Based Relapse Prevention (MBRP) in lieu of 8 sessions of their UCC</p> <p>Con 1: 8 sessions of Cognitive-Behavioral Relapse Prevention (RP) in lieu of 8 sessions of UCC</p> <p>Con 2: UCC (12-step programming, facilitated group discussion, and psychoeducation)</p>	<p>Adults (age 18+) who recently completed 90-day intensive outpatient or 30-day inpatient SUD treatment</p>	<p>$N = 286$ (F=28%, M=72%)</p> <p>Exp: $n = 103$ (F=26%, M=74%)</p> <p>Con 1: $n = 88$ (F=36%, M=64%)</p> <p>Con 2: $n = 95$ (F=27%, M=73%)</p>	3, 6, and 12 months after baseline (initial study enrollment)	<p>Exp:</p> <p>3 months: 88%</p> <p>6 months: 83%</p> <p>12 months: 77%</p> <p>Con 1:</p> <p>3 months: 82%</p> <p>6 months: 76%</p> <p>12 months: 73%</p> <p>Con 2:</p> <p>3 months: 74%</p> <p>6 months: 68%</p> <p>12 months: 67%</p>	None	<p>No illicit drug Use past 90 days: MBRP = RP = UCC at 3 months; MBRP/RP > UCC and MBRP = RP at 6 months; MBRP/RP = UCC and MBRP = RP at 12 months</p> <p>Days of no illicit drug Use among those who used in past 90 days: MBRP = RP = UCC at 3 months; MBRP/RP = UCC and MBRP = RP at 6 months; MBRP/RP = UCC and MBRP > RP at 12 months</p> <p>No heavy drinking past 90 days: MBRP = RP = UCC at 3 months; MBRP/RP > UCC and MBRP = RP at 6 months; MBRP/RP = UCC and MBRP > RP at 12 months</p> <p>Non-heavy Drinking Days (4+ drinks for women and 5+ for men in one occasion) among those who drank in past 90 days: MBRP/RP = UCC and MBRP = RP at 3 months; MBRP/RP > UCC and MBRP = RP at 6 months; MBRP/RP =</p>

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
								UCC and RP = MBRP at 12 months
Cooney et al., 1991	RCT	Exp: 26 sessions (90 mins. per week) of coping skills training aftercare Exp 2: 26 sessions (90 mins. per week) of interactional group therapy aftercare	Men and women who completed a 21-day inpatient substance-use treatment program and had a DSM-III diagnosis of alcohol dependence or abuse	N = 96 (M/F proportions not specified)	6, 12, and 24 months after baseline (initiation of aftercare treatment)	6 months: 90% 12 months: 89% 24 months: 79%	Alcohol	Non-heavy Drinking Days Over time: Coping Skills = Interactional (Coping Skills > Interactional if higher in psychiatry severity; Interactional > Coping Skills if lower in psychiatric severity)
Godley et al., 2007	RCT	Exp: 90 days (12 sessions) of Assertive Continuing Care (ACC; case management and interventions based on the adolescent community reinforcement approach [A-CRA]) either in supplement to or in place of usual continuing care Con: UCC (referrals to adolescent outpatient CC providers offering a wide range of services and programs)	Adolescents (ages 12-18) attending residential SUD treatment who had a DSM-IV diagnosis of substance dependence	N = 183 (F=29%, M=71%) ACC: n = 102 (F=30%, M=70%) UCC: n = 81 (F=27%, M=73%)	3 (end of CC), 6, and 9 months after treatment discharge	Overall: 3 months: 96% 6 months: 95% 9 months: 94% 92% completed all three follow-up assessments	Current Substance Dependence for the following: Alcohol: 54% Cocaine: 15% Marijuana: 87% Other: 14%	Complete abstinence: ACC = UCC at 1-3 and 1-9 months Alcohol abstinence: ACC = UCC at 1-3 and 1-9 months Marijuana abstinence: ACC > UCC at 1-9 months, but ACC = UCC at 1-3 months (CC activities, such as 12-step MHO meetings, as well as use of A-CRA skills in daily life predicted early abstinence, which, in turn, predicted sustained abstinence)

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Godley et al., 2014	RCT	<p>Exp 1: Contingency Management (targeting negative alcohol/illicit drug screens and "prosocial" activities over 12 weeks) plus UCC</p> <p>Exp 2: 10 sessions of ACC (over 12 weeks) plus UCC</p> <p>Exp 3: ACC plus CM plus UCC</p> <p>Con: UCC</p>	<p>Adolescents (ages 12-18) attending residential SUD treatment who had a DSM-IV SUD diagnosis</p>	<p>$N = 305$ (F=37%, M=63%)</p> <p>Exp 1: $n = 73$ (F=29%, M=71%)</p> <p>Exp 2: $n = 71$ (F=44%, M=56%)</p> <p>Exp 3: $n = 82$ (F=37%, M=63%)</p> <p>Con: $n = 79$ (F=35%, M=65%)</p>	3, 6, 9, and 12 months after treatment discharge	<p>Overall:</p> <p>3 months: 95%</p> <p>6 months: 93%</p> <p>9 months: 90%</p> <p>12 months: 91%</p>	<p>Substance Use Disorder:</p> <p>Alcohol: 58%</p> <p>Marijuana: 91%</p> <p>Alcohol and Marijuana: 54%</p>	<p>PDA alcohol and other drugs over time: CM > UCC (d = .41) and ACC > UCC (d = .30) but ACC + CM = UCC</p> <p>% "in remission" at 12 months (living in community and no use or SUD symptoms for past 30 days): CM > UCC (33 vs 15%; d = .54) and ACC > UCC (27 vs. 15%; d = .51) but ACC + CM = UCC</p> <p>ACC = CM on majority of treatment outcomes</p>
Godley et al., 2010	RCT	<p>Exp 1: Chestnut Bloomington Outpatient (CBOP), a 14-week manualized treatment with primarily group, as well as a limited number of individual and family sessions without ACC</p> <p>Exp 2: CBOP with ACC</p> <p>Exp 3: Motivational Enhancement Therapy / Cognitive Behavioral Therapy-7 session model (MET/CBT 7) without ACC</p> <p>Exp 4: MET/CBT 7 with ACC</p>	<p>Adolescents (ages 13-18) who met ASAM's Patient Placement Criteria for Level 1 outpatient treatment based on a diagnosis of substance abuse or dependence</p>	<p>$N = 320$ (F=24%, M=76%)</p> <p>Exp 1: $n = 80$ (F=24%, M=76%)</p> <p>Exp 2: $n = 80$ (F=18%, M=82%)</p> <p>Exp 3: $n = 79$ (F=27%, M=73%)</p> <p>Exp 4: $n = 81$ (F=30%, M=70%)</p>	3, 6, 9, and 12 months after treatment admission	<p>Overall:</p> <p>3 months: 97%</p> <p>6 months: 96%</p> <p>9 months: 93%</p> <p>12 months: 91%</p>	<p>Substance Use Disorder:</p> <p>Alcohol Dependence: 11%</p> <p>Alcohol Abuse: 38%</p> <p>Marijuana Dependence: 31%</p> <p>Marijuana Abuse: 44%</p> <p>Other Substance Dependence: 3%</p> <p>Other Substance Abuse: 3%</p>	<p>PDA over time: CBOP (with or without ACC) > MET/CBT 7 (with or without ACC)</p> <p>MET/CBT 7 without ACC most cost-efficient per-day-abstinent % "In recovery" at 12 months (past 30-day abstinence, no substance use problems and living in community): CBOP without ACC (29%) = CBOP with ACC (38%) = MET/CBT 7 without ACC (44%) = MET/CBT 7 with ACC (30%)</p> <p>MET/CBT 7 without ACC most cost-efficient per-person-in-recovery</p>

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
Graham et al., 1996	RCT	Exp 1: 12 weekly sessions of Group Relapse Prevention Training (Group CC) Exp 2: 12 weekly sessions of Individual Relapse Prevention Training (Ind CC)	Adults who completed inpatient SUD treatment for moderate-to-severe alcohol and/or drug problems and adults who completed outpatient treatment for low-to-moderate alcohol and/or drug problems	$N = 189$ (F=27%, M=73%) Exp 1: $n = 96$ (F=27%, M=73%) Exp 2: $n = 93$ (F=27%, M=73%)	3, 6, 9, and 12 months after inpatient/outpatient treatment	Overall: 74% Inpatients: 3 months: 92% 6 months: 78% 9 months: 70% 12 months: 76% Outpatients: 3 months: 66% 6 months: 58% 9 months: 58% 12 months: 72%	N/A	Group CC = Ind CC on a range of substance use outcomes at 12 months (e.g., drinking and other drug using days)
Lash et al., 2007	RCT	Exp: UCC plus Contracting, Prompting, and Reinforcing (CPR; Contract for 8 weeks of UCC participation, prompts for attendance and feedback on progress, and social reinforcement of attendance) Con: UCC (individual session post-treatment to encourage attendance of CC groups and 12-step MHO participation – repeated at week 9)	Adults who completed inpatient treatment at a Veterans Affairs medical center and had a diagnosis of substance dependence	$N = 150$ (F=3%, M=97%) Exp: $n = 75$ Con: $n = 75$	3, 6, and 12 months after treatment entry	Overall: 3 months: 81% 6 months: 81% 12 months: 79% Exp: 3 months: 81% 6 months: 73% 12 months: 79% Con: 3 months: 80% 6 months: 87% 12 months: 78%	Overall: Alcohol Dependence only: 34% Drug Dependence with or without Alcohol Dependence: 66%	% Complete abstinence: CPR > UCC at 12 months (57 vs 37%), but not 3 or 6 months (Mediation suggested more CC attendance partially explained this effect) Drinking consequences over time: CPR = UCC
Lash et al., 2013	RCT	Exp: UCC plus Contracting, Prompting, and Reinforcing (CPR; Contract for 9 weeks of UCC participation – repeated at week 9 – as well as 12-step MHO goals, prompts for attendance and feedback on progress for	Adults who completed inpatient or outpatient treatment at Veterans Affairs medical	$N = 183$ (F=4%, M=96%) Exp: $n = 92$ Con: $n = 91$	3, 6, and 12 months after treatment entry	Overall: 3 months: 91% 6 months: 92% 12 months: 88%	Overall: Alcohol Dependence only: 33% Drug Dependence with or without Alcohol Dependence: 67%	% Complete abstinence: CPR = UCC at 3, 6, and 12 months Alcohol and other drug problems over time: CPR = UCC

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		both CC and 12-step MHOs, and social reinforcement of attendance and abstinence) Con: UCC post-treatment (encouragement of CC groups and 12-step MHO participation)	centers and had a diagnosis of substance dependence					Days 12-step MHO attendance over the 12-month follow-up: CPR = UCC
McKay et al., 1999	RCT	Exp: 5-6 months of Individual Relapse Prevention (RP) CC sessions (one individual cognitive-behavioral relapse prevention session per week and one group session per week) and eligibility for longer-term UCC (one group session per week for up to an additional 18 months) Con: 5-6 months of UCC (two group therapy sessions per week with a 12-step MHO, relational approach) and eligibility for longer-term UCC (one group session per week for up to an additional 18 months)	Male veterans who completed SUD treatment (primarily intensive outpatient) and had a DSM-III-R diagnosis of lifetime cocaine dependence and recent cocaine use	$N = 132$ (F=0%, M=100%) Exp: $n = 63$ Con: $n = 69$	6, 12, 18, and 24 months post CC intake	Overall: 6 months: 98% 24 months: 92%	Current Cocaine Dependence: 24% Current Alcohol Dependence: 16%	% Days of cocaine use over time: RP = UCC (RP > UCC if abstinence goal) % days of heavy drinking (7+ drinks in one day) over time: RP = UCC (RP > UCC if had alcohol dependence)
McKay et al., 2010a	RCT	Exp 1: 20 weeks of Cognitive-Behavioral Relapse Prevention (RP) CC (One individual CBT relapse prevention session per week) Exp 2: 12 weeks of Contingency Management (CM) CC Exp 3: 20 weeks of RP+CM	Adults who completed intensive outpatient SUD treatment and had a current DSM-IV diagnosis of cocaine dependence	$N = 100$ (F=58%, M=42%) Exp 1: $n = 24$ (F=50%, M=50%) Exp 2: $n = 26$ (F=62%, M=38%)	3, 6, 9, 12, 15, and 18 months after baseline (upon completion of the 2nd week of intensive outpatient SUD treatment)	Overall: 3 months: 95% 6 months: 94% 9 months: 88% 12 months: 84% 15 months: 81% 18 months: 76%	Cocaine	Complete cocaine abstinence, self-report and toxicology screens: CM and RP+CM > RP and UCC (10-20% higher over time), however RP and CM plus RP = CM and TAU

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		Con: UCC (one group session per week up to 4 months)		Exp 3: $n = 25$ (F=64%, M=36%) Con: $n = 25$ (F=56%, M=44%)				
O'Farrell et al., 1998 (30-month outcomes)	RCT	Exp: 4-5 months of Behavioral Marital Therapy plus 15, 50-75 minute sessions of individual Couples Relapse Prevention (RP) CC (one session every 2 weeks for 3 months, every 3 weeks for the subsequent 3 months, every 4 weeks in the following 3 months, and every 6 weeks in the following 3 months) over 1 year following completion of behavioral marital therapy	Men recruited via the VA and the community who completed 4-5 months of weekly VA behavioral marital therapy with their spouses, and had a DSM-III-R diagnosis of alcohol abuse or dependence	$N = 59$ (F=0%, M=100%) Exp: $n = 30$ Con: $n = 29$	1 year prior to behavioral marital therapy, 1 week after the final behavioral marital therapy session, and at 3, 6, 12, 18, 24, and 30 months after completion of behavioral marital therapy	N/A (Analyses only included completers – and dropouts were replaced in the random assignment algorithm)	Alcohol	PDA alcohol: RP > UCC through 18 months (PDA = 91 vs 77 at 18 months), but RP = UCC at 24 and 30 months (For those with more severe marital – but not alcohol problems – RP > UCC over time)
O'Farrell et al., 1993 (12-month outcomes)		Con: 4-5 months of Behavioral Marital Therapy (6-8 weekly individual-couples sessions followed by 10 weekly couples group sessions) without Couples RP CC						
Project MATCH Research Group, 1997	RCT	Exp 1: Weekly sessions of Cognitive Behavioral Coping Skills Therapy for 12 weeks (CBT) Exp 2: Four sessions of Motivational Enhancement Therapy during weeks 1, 2, 6, and 12 (MET)	Adults participating in Project MATCH “Aftercare” arm, who had a DSM-III-R diagnosis of alcohol abuse	$N = 774$ (F=20%, M=80%)	3 (end MATCH treatment), 6, 9, 12, and 15 months (i.e., 1-year post-MATCH intervention final session)	93% of living participants at 15 months	Alcohol	PDA over time: CBT = MET = TSF (53% abstinent or no alcohol-related problems in the past 90 days at 1-year post-treatment), and TSF > CBT = MET toward end of follow-up period

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		Exp 3: Weekly sessions of 12-step Facilitation Therapy for 12 weeks (TSF)	or dependence and received 7+ days of inpatient or intensive day hospital SUD treatment					DDD over time: CBT = MET = TSF
Sacks et al., 2011	RCT	<p>Exp: 6 months of "Modified Therapeutic Community Aftercare" (an <u>integrated</u> CC program of outpatient activities delivered in SUD residential treatment that incorporated training and facilitating client integration - of all 3 co-occurring disorders – aftercare included weekly health and self-management group, peer group, informal social self-help group, family support group, and bi-weekly individual case management)</p> <p>Con: Standard Aftercare (outpatient SUD counseling, mental health counseling at an outpatient mental health treatment program, and continuing medical care at a community medical/HIV clinic; separate case managers for each discrete aspect of care)</p>	Adults with co-occurring DSM-IV SUD, other psychiatric disorder, and HIV/AIDS, who completed 6 months of Modified Therapeutic Community Residential SUD Treatment that catered to individuals with these co-occurring disorders	<p>$N = 76$ (F=37%, M=63%)</p> <p>Exp: $n = 42$ (F=40%, M=60%)</p> <p>Con: $n = 34$ (F=32%, M=68%)</p>	6 and 12 months after initial entry to CC	<p>Overall: 6 months: 76% 12 months: 72%</p> <p>Exp: 6 months: 74% 12 months: 81%</p> <p>Con: 6 months: 79% 12 months: 62%</p>	<p>Alcohol Abuse/Dependence: 56%</p> <p>Drug Abuse/Dependence: 100%</p>	<p>Substance use composite past 6-months (less drug use and alcohol intoxication) at 12 months: MTC-A > UCC only for higher functioning patients, MTC-A = UCC for lower functioning patients</p> <p>Physical health composite (self-reported health and less health care utilization): MTC-A > UCC</p> <p>Mental health composite and other domains (e.g., HIV Risk behavior and residential stability): MTC-A = UCC</p>
Sannibale et al., 2003	RCT	Exp: Nine sessions of Structured CC over 6 months (CBT-based)	Adults who completed 4 weeks of inpatient SUD treatment and	<p>$N = 77$ (F=19%, M=81%)</p> <p>Exp: $n = 39$ (F=20%, M=80%)</p>	3, 6, 9, and 12 months following inpatient SUD treatment discharge	<p>Overall: 3-month follow-up: 79% 6-month follow-up: 65%</p>	<p>Exp: Alcohol Dependence: 68%</p> <p>Heroin Dependence: 24%</p>	<p>Abstinent/"controlled"/ "uncontrolled" from primary substance (no use/no more than 6 drinks for men or 4 for women per day or</p>

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		Con: 6 months of Unstructured/Usual CC (UCC; encouragement to maintain contact with patients' primary clinicians and provided crisis counseling on request)	were diagnosed with DSM-IV alcohol and/or heroin dependence	Con: $n = 38$ (F=18%, M=82%)		9-month follow-up: 35% 12-month follow-up: not reported	Alcohol and Heroin Use Disorder: 8% Additional Substance Use Disorder: 32% Exp: Alcohol Dependence: 63% Heroin Dependence: 16% Alcohol and Heroin Use Disorder: 21% Additional Substance Use Disorder: 61%	opioids less than once per day/exceeded "controlled" criteria) at 12 months: CC > UCC less likely to demonstrate uncontrolled use (OR = 3.3) Psychiatric Symptoms: CC = UCC
Continuing Care - Telephone								
Burleson et al., 2012	RCT	Exp 1: Five sessions of F2F CC (One functional analysis session and 4 MET/CBT sessions) Exp 2: 5 sessions of Brief Telephone CC (1 functional analysis session and 4 MET/CBT sessions) Con: No CC	Adolescents (ages 13-18) who completed 9 weekly CBT sessions in an outpatient SUD treatment setting and were diagnosed with a DSM-IV alcohol use disorder	$N = 121$ (F=34%, M=61%) Exp 1: $n = 38$ (F=42%, M=58%) Exp 2: $n = 42$ (F=33%, M=67%) Con: $n = 41$ (F=27%, M=73%)	3, 6, and 12 months after baseline (completion of aftercare)	Exp 1 & 2: 3 months: 98% 6 months: 96% 12 months: 95% Con: 3 months: 80% 6 months: 85% 12 months: 76%	Alcohol Additional Substance use disorder (DSM-IV abuse/dependence): Exp 1: 79% Exp 2: 79% Con: 95%	PDA alcohol per month over time: F2F CC = Telephone CC = No CC DDD alcohol per month over time: F2F CC = Telephone CC = No CC
Farabee et al., 2013	RCT	Exp: Seven telephone-based counseling sessions over 12 weeks (modeled on Hazelden Betty Ford's TELE protocol) with two levels of structure (use of recovery activities questionnaire versus not) and directiveness (direct encouragement and facilitation of recovery	Adults who were nearing completion of or had completed an intensive structured outpatient SUD treatment	$N = 302$ (F=27%, M=73%)	3 and 12 months after completing the primary phase of outpatient treatment	Overall: 3 months: 95% 12 months: 86%	Methamphetamine: 56% Cocaine: 30% Methamphetamine and Cocaine: 14%	Drug score on the Addiction Severity Index: Four TELE groups combined > decrease compared to Con on baseline to 3 month, but not 3 month to 12 month; no differences among the four TELE groups on

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		activity planning) yielding four experimental conditions: 1) unstructured/nondirective; 2) structured/nondirective; 3) unstructured/directive; 4) structured/directive Con: UCC (standard referral to CC and no telephone-based counseling sessions)						any substance use outcome
Fitzgerald & Mulford, 1985	RCT	Exp: UCC plus 24 sessions over 12 months of treatment-center initiated telephone-based CC using a non-directive, supportive approach Con: UCC (no telephone-based aftercare)	Adults who received inpatient SUD treatment for an alcohol-use problem	$N = 288$ (F=28%, M=72%) Exp: $n = 123$ (F=28%, M=72%) Con: $n = 165$ (F=28%, M=72%)	12 months after treatment discharge	Overall: 12 months:81%	Alcohol	Telephone CC = UCC on several drinking outcomes, including complete abstinence and binge drinking (5+ drinks in 2 hour period)
McKay et al., 2004 (12-month outcomes)	RCT	Exp 1: 12 weeks of Individualized Relapse Prevention (RP) CC (one individual relapse prevention session per week and one group session per week)	Adults who completed a VA or community-based 4-week intensive outpatient treatment program and had a DSM-IV diagnosis of cocaine or alcohol dependence	$N = 359$ (F=17%, M=83%) Exp 1: $n = 135$ ($n = 63$ VA, $n = 72$ community)	3, 6, 9, 12, 18, and 24 months after baseline (final week of intensive outpatient treatment)	Community-based outpatient: 3 months: 94% 6 months: 90% 9 months: 89% 12 months: 89% VA outpatient: 3 months: 97% 6 months: 96% 9 months: 95% 12 months: 95% Overall: follow-up months 3-12: $\geq 90\%$ 18 months: 89% 24 months: 86%	Cocaine and Alcohol Cocaine Dependence with or without Alcohol Dependence: 75% Alcohol Dependence only: 25%	PDA alcohol and cocaine over time: TEL = RP and TEL = UCC Complete abstinence from alcohol and cocaine over time: TEL > UCC (for greater risk/severity patients UCC > TEL) Substance-related consequences over time: TEL = RP and TEL = UCC Cost-Benefit Analysis: TEL > UCC by \$300 saved per abstinent year for health care systems and \$1400 saved per
McKay et al., 2005 (24-month outcomes)		Exp 2: 12 weeks of Telephone Monitoring and Brief Counseling CC (TEL) (One F2F session followed by one 15 minute session each week delivered by phone) plus the opportunity to attend support groups for the first 4 weeks of CC and		Exp 2: $n = 102$ ($n = 45$ VA, $n = 57$ community) Con: $n = 122$ ($n = 67$ VA, $n = 55$ community)				
Shepard et al., 2016 (Cost-Benefit Analysis)								

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		beyond if clinically indicated						abstinent year from a societal perspective
		Con: 12 weeks of UCC (two group therapy sessions per week with a 12-step MHO, relational spirit)						
McKay et al., 2011 (24-month outcomes)	RCT	Exp 1: UCC plus 18 months of Telephone Monitoring and Feedback (TM) (One 5-10 minute telephone session per week for 2 months, two sessions per month for the next 10 months, and one session per month for the remaining 6 months)	Adults who completed 3 weeks of community-based intensive outpatient SUD treatment and had a current diagnosis of DSM-IV alcohol dependence	N = 252 (F=36%, M=64%) Exp 1: n = 83 (F=41%, M=59%) Exp 2: n = 83 (F=27%, M=73%) Con: n = 86 (F=40%, M=60%)	3, 6, 9, 12, 15, 18, 21, and 24 months after baseline (weeks 3-4 of IOP)	Overall: 3 months: 89% 6 months: 86% 9 months: 81% 12 months: 79% 15 months: 77% 18 months: 76% 21 months: 75% 24 months: 74%	Current Alcohol Dependence: 100% Current Cocaine Dependence: 49%	PDA alcohol: TMC = TM > UCC (d's ~ .4 - .5) out to 18 months (end of CC), but TMC = TM = UCC at 24 months (6 months after CC ended)
McKay et al., 2010b (18-month outcomes)		Exp 2: UCC plus 18 months of Telephone Monitoring, Feedback, and counseling (TMC) that reviewed goals, challenges, and planned coping response (One 5-10 minute telephone session per week for 2 months, two sessions per month for the next 10 months, and one session per month for the remaining 6 months)				Exp 1: 3 months: 87% 6 months: 84% 9 months: 81% 12 months: 78% 15 months: 78% 18 months: 76% 21 months: 72% 24 months: 71%		PDNHD (5+ drinks for women and 4+ for women in 1 day): TMC > TM = UCC out to 18 months (d's ~ .4 - 5) but TMC = TM = UCC at 24 months
		Con: UCC (opportunity to attend one group counseling session per week for approximately 2-3 months, after completion of intensive outpatient SUD treatment))				Exp 2: 3 months: 88% 6 months: 83% 9 months: 77% 12 months: 73% 15 months: 72% 18 months: 71% 21 months: 70% 24 months: 71%		"Good clinical outcome" (covered drinking, other drug use, and treatment utilization) at 24 months: TMC (60%) > UCC (46%), though just missed significance (TMC > UCC generally for all three outcomes for patients with network support for drinking and prior alcohol treatment, but not for those without)
						Con: 3 months: 92% 6 months: 91% 9 months: 85%		

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
						12 months: 84% 15 months: 81% 18 months: 80% 21 months: 81% 24 months: 79%		
McKay et al., 2013a	RCT	Exp 1: UCC plus 24 months of TMC (20-minute phone calls weekly for 8 weeks, biweekly for 44 weeks, and monthly for 6 months)	Adults who participated in intensive outpatient treatment, were diagnosed with lifetime DSM-IV cocaine dependence, and cocaine use in past 6 months	N = 321 (F=24%, M=76%) Exp 1: n = 106 (F=24%, M=76%) Exp 2: n = 107 (F=22%, M=78%) Con: n = 108 (F=24%, M=76%)	3, 6, 9, 12, 18, and 24 months after baseline (week 3 of intensive outpatient SUD treatment)	Overall: 3 months: 79% 6 months: 77% 9 months: 72% 12 months: 73% 18 months: 71% 24 months: 75%	Overall: Current Cocaine Dependence: 83% Current Alcohol Dependence: 39% Current Cannabis Dependence: 12% Current Opioid Dependence: 2% Current Sedative Dependence: 1%	"Good substance outcome" (no illicit drug use or heavy drinking) over time: TMC = TMC plus CM = UCC (For those with any cocaine use or any drinking 30 days prior to start of CC, TMC > UCC, ORs ~ 2 – 2.5, but not for those abstinent from cocaine or alcohol prior to start of CC) Cost-Benefit Analysis: TMC > TMC plus CM = UCC (cost saving of \$1500 per patient over 2-year study period – accounted for primarily more severe patients)
McCollister et al., 2016 (Cost-Benefit Analysis)		Exp 2: UCC plus 24 months of TMC and CM targeting TMC adherence Con: UCC (opportunity to attend one group counseling session per week for approximately 2-3 months, after completion of intensive outpatient SUD treatment)						
McKay et al., 2013b	RCT	Exp: UCC plus 30 sessions of Enhanced Continuing Care (ECC; 20-minute, in-person and/or telephone based sessions over 12 months – weekly for 8 weeks and biweekly thereafter – CBT-based counseling, CM for session attendance, and case management) Con: UCC (optional attendance of one group session per week for 2-3	Adults enrolled in an intensive outpatient SUD treatment program and had a DSM-IV lifetime diagnosis of cocaine dependence	N = 152 (F=23%, M=77%) Exp: n = 74 (F=18%, M=82%) Con: n = 78 (F=28%, M=72%)	3, 6, 9, and 12 months after baseline (week 1 of intensive outpatient SUD treatment)	Overall: 3 months: 78% 6 months: 73% 9 months: 73% 12 months: 76% Exp: 3 months: 78% 6 months: 73% 9 months: 69% 12 months: 70% Con: 3 months: 76% 6 months: 72% 9 months: 73%	Exp: Current Cocaine Dependence: 69% Current Alcohol Dependence: 32% Con: Current Cocaine Dependence: 70% Current Alcohol Dependence: 27%	Cocaine-negative toxicology screens over time: UCC > ECC (e.g., 80 vs. 48% at 12 months) "Good substance outcome" (no illicit drug use or heavy drinking) over time: UCC > ECC (e.g., 43 vs. 26% at 12 months)

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		months after intensive outpatient treatment)				12 months: 78%		
McKellar et al., 2012	RCT	Exp: 24 weeks of Telephone Case Monitoring (TCM; one 10-15 minute telephone session per week) Con: In-Person UCC (1 to 2 F2F group sessions per week for an unlimited length of time)	Adults who completed ~3 weeks of a VA-based intensive outpatient SUD treatment program and had an ICD-9 diagnosis of alcohol and/or drug dependence	N = 667 (F=5%, M=95%) Exp: n = 213 (F=5%, M=95%) Con: n = 454 (F=5%, M=95%)	3 and 12 months after baseline (after treatment intake and prior to start of CC)	Overall: 3 months: 78% 12 months: 79%	None	PDA alcohol: TCM > UCC at 3 months (3 more PDA), but TCM = UCC at 12 months Psychiatric symptoms: TCM > UCC at 3 months ("not clinically significant"), but TCM = UCC at 12 months
Continuing Care - Digital								
Gonzales et al., 2016	RCT	Exp: 12 weeks of daily text messaging CC (monitoring, feedback, reminders, education/support) Con: UCC (referrals to mutual-help groups, including 12-step MHOs)	Youth (ages 12-25) who completed inpatient or outpatient SUD Treatment in Southern California, and owned a mobile phone with text-message capabilities	N = 80 (F=28%, M=72%) Exp: n = 40 (F=37.5%, M=62.5%) Con: n = 40 (F=19.5%, M=80.5%)	6 and 9 months post CC completion	Overall: 6 months: 86% 9 months: 83%	Overall: Marijuana: 35% Heroin: 11% Methamphetamine: 29% Cocaine: 16% Alcohol: 4% Rx Drugs: 5% Exp: Marijuana: 22.5% Heroin: 12.5% Methamphetamine: 37.5% Cocaine: 15% Alcohol: 5% Rx Drugs: 7.5% Con: Marijuana: 49%	No relapse (any use of primary substance): CC > UCC at 6 months (OR = 1.39) and 9 months (OR = 1.35) Abstinence self-efficacy: CC > UCC (OR = 1.36) Mutual-help as well as other recovery related activities: CC > UCC at 6 months and CC > UCC at 9 months

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
							Heroin: 10% Methamphetamine: 20% Cocaine: 17% Alcohol: 2% Rx Drugs: 2%	
Gustafson et al., 2014	RCT	Exp: 12 months of UCC, including 8 months with access to the Addiction-Comprehensive Health Enhancement Support System (A-CHESS), a mobile smartphone application integrated with clinical monitoring (monitoring, information, communication, and support services) Con: 12 months of UCC (typical counselor response to residential patients over time, e.g., requests for referrals)	Adults who completed inpatient SUD treatment and met DSM-IV criteria for alcohol dependence	$N = 349$ (F=39%, M=61%) Exp: $n = 170$ (F=39%, M=61%) Con: $n = 179$ (F=39%, M=61%)	4, 8, and 12 months after SUD treatment discharge	Overall: 4 months: 88% 8 months: 85% 12 months: 78% Exp: 4 months: 89% 8 months: 86% 12 months: 78% Con: 4 months: 86% 8 months: 83% 12 months: 78%	Alcohol	Alcohol abstinence in the past 30 days at all follow-ups: ACHESS+UCC > UCC (52 vs 40%; OR = 1.65) Risky drinking days (5+ drinks for men or 4+ for women in 2-hr period) in the past 30 days at all follow ups: ACHESS+UCC > UCC (d = .23)
Rose et al., 2015	RCT	Exp: 4 months of Alcohol Therapeutic Interactive Voice Response continuing care (ATIVR; fully automated CC including daily monitoring, feedback, targeted skills encouragement – CBT and other coping skills – as well as a monthly personalized therapist message; required one journal entry per day and optional use of other provided features as needed)	Adults with a current or lifetime diagnosis of DSM-IV alcohol dependence, who completed 8-12 sessions of group CBT for alcohol dependence	$N = 158$ (F=47%, M=53%) Exp: $n = 81$ (F=47%, M=53%) Con: $n = 77$ (F=47%, M=53%)	After completion of CBT, and 2 weeks, 2 months, 4 months, and 12 months after start of CC	Exp: Post CBT: 100% 2 weeks: 89% 2 months: 85% 4 months: 86% 12 months: 74% Con: Post CBT: 100% 2 weeks: 90% 2 months: 97% 4 months: 90% 12 months: 79%	Alcohol	Past 30-day alcohol abstinence at 12 months: ATIVR = No ATIVR Past 30-day non-heavy drinking at 12 months: ATIVR = No ATIVR

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
		Con: UCC (not detailed in study)						
Long-Term Recovery Management								
Dennis et al., 2003	RCT	Exp: Quarterly Recovery Management Checkups (RMC; assessment, motivational interviewing, and linkage to treatment re-entry) Con: Quarterly Assessment only	Adults who completed inpatient or outpatient SUD treatment	<i>N</i> = 448 (F=59%, M=41%) Exp: <i>n</i> = 224 Con: <i>n</i> = 224	3, 6, 9, 12, 15, 18, 21, and 24 months after baseline (immediately prior to treatment entry)	Overall: 94%-96% at any given follow-up assessment 82% completed all 8 follow-up assessments	None Rates of lifetime dependence: Alcohol only: 7% Cocaine only: 29% Opioids only: 14% Alcohol and Cocaine: 20% Cocaine and Opioids: 8% Other: 17%	Return to treatment (after index episode discharge): RMC more likely than Assessment-Only to return to treatment (OR = 1.65) and to return sooner (376 vs. 600 days after discharge) Total Days Received Treatment: RMC (62 days) > Assessment-Only (40 days) "In Need of Treatment" composite (recent use, problems, or subjective need): 43 % RMC vs. 56% Assessment-Only in need at 24 month follow-up; 23% RMC vs. 32% Assessment-Only with five to eight (out of eight) total quarters of need
Dennis & Scott, 2012 (48-month outcomes)	RCT	Exp: Quarterly Recovery Management Checkups enhanced from Dennis et al. 2003 (e.g., transportation to treatment) Con: Quarterly Assessment only	Adults who completed inpatient or outpatient SUD treatment	<i>N</i> = 446 (F=46%, M=54%) Exp: <i>n</i> = 223 Con: <i>n</i> = 223	3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, and 48 months after baseline (immediately prior to treatment entry)	Overall: RMC: 79% completed all 16 follow-up assessments Con: 82% completed all 16 follow-up assessments	None Any Substance Dependence: 88% Lifetime dependence: Alcohol: 24% Cocaine: 61% Opioids: 25% Cannabis: 5%	Abstinent Days over the 4-year study period: RMC > Assessment-Only (<i>d</i> = .24) (Those with criminal histories and who used before age 15 had greater RMC abstinence-related benefit) Return to treatment (after index episode discharge):

Article	Study design	Intervention(s)	Description of sample	Sample size (N)	Follow-ups	Retention rate	Primary substance	Substance use and related outcomes
comparison with Dennis & Scott, 2003)								RMC fewer months than Assessment-Only before return to treatment (d = .61), and more instances of 7+ days outpatient or 14+ days residential (d = .37) Quarters without treatment need: RMC > Assessment-Only (d = .25)

Note: Exp = experimental condition, Con = control condition, PTSD = post-traumatic stress disorder, RCT = randomized control trial

APPENDIX A: SYSTEMATIC REVIEW SEARCH SYNTAX

A. Peer-based recovery support services

Pubmed

((("Recovery coaching"[Title/Abstract] OR "Peer recovery support "[Title/Abstract] OR "Peer-based recovery support services"[Title/Abstract] OR "Individual peer support"[Title/Abstract])) AND ((recovery[Title/Abstract] OR remission[Title/Abstract] OR abstinence[Title/Abstract] OR "harm reduction"[Title/Abstract] OR "substance abuse"[Title/Abstract] OR "substance misuse"[Title/Abstract] OR "substance dependence"[Title/Abstract] OR "drug dependence"[Title/Abstract] OR "substance use disorder"[Title/Abstract] OR "alcohol use disorder"[Title/Abstract] OR "drug use disorder"[Title/Abstract] OR alcohol*[Title/Abstract] OR marijuana[Title/Abstract] OR "THC"[Title/Abstract] OR cannabis[Title/Abstract] OR cocaine[Title/Abstract] OR heroin[Title/Abstract] OR opioid*[Title/Abstract] OR opiate*[Title/Abstract] OR narcotic*[Title/Abstract] OR amphetamine*[Title/Abstract] OR methamphetamine*[Title/Abstract] OR benzodiazepine*[Title/Abstract] OR barbiturate*[Title/Abstract] OR hallucinogen*[Title/Abstract] OR inhalant*[Title/Abstract] OR steroid*[Title/Abstract] OR "club drug*" [Title/Abstract] OR ecstasy[Title/Abstract] OR "MDMA"[Title/Abstract] OR stimulant*[Title/Abstract] OR cost-benefit[Title/Abstract] OR cost-offset[Title/Abstract] OR cost-effectiveness[Title/Abstract]) OR "cost benefit"[Title/Abstract] OR "cost offset"[Title/Abstract] OR "cost effectiveness"[Title/Abstract]))

Embase

('Recovery coaching':ab,ti OR 'Peer recovery support':ab,ti OR 'Peer-based recovery support services':ab,ti OR 'Individual peer support':ab,ti) AND (recovery:ab,ti OR remission:ab,ti OR abstinence:ab,ti OR 'harm reduction':ab,ti OR 'substance abuse':ab,ti OR 'substance misuse':ab,ti OR 'substance dependence':ab,ti OR 'drug dependence':ab,ti OR 'substance use disorder':ab,ti OR 'alcohol use disorder':ab,ti OR 'drug use disorder':ab,ti OR alcohol*:ab,ti OR marijuana:ab,ti OR 'THC':ab,ti OR cannabis:ab,ti OR cocaine:ab,ti OR heroin:ab,ti OR opioid*:ab,ti OR opiate*:ab,ti OR narcotic*:ab,ti OR amphetamine*:ab,ti OR methamphetamine*:ab,ti OR benzodiazepine*:ab,ti OR barbiturate*:ab,ti OR hallucinogen*:ab,ti OR inhalant*:ab,ti OR steroid*:ab,ti OR 'club drug*':ab,ti OR ecstasy:ab,ti OR 'MDMA':ab,ti OR stimulant*:ab,ti OR cost-benefit:ab,ti OR cost-offset:ab,ti OR cost-effectiveness:ab,ti OR 'cost benefit':ab,ti OR 'cost offset':ab,ti OR 'cost effectiveness':ab,ti)

CINAHL

AB ("Recovery coaching" OR "Peer recovery support" OR "Peer-based recovery support services" OR "Individual peer support") AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

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“substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

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CENTRAL (Cochrane Registry)

Same as for CINAHL

PsycINFO

Same as for CINAHL

Inclusion/Exclusion Criteria

1. Quantitative Data
2. Pubmed
 - Embase
 - CINAHL
 - CENTRAL (Cochrane Registry)
 - Same as for CINAHL
 - PsycINFO
 - Inclusion/Exclusion Criteria
 - 1. Quantitative Data
 - 2. Measured substance use outcome (abstinence, drinking intensity, consequences), other marker of SUD recovery (quality of life, psychiatric symptoms, etc.), and/or health care costs
 - 3. Adolescent or adult – no limitations on age range
 - 4. No coerced populations or studies where individuals are institutionalized while receiving the recovery support service (e.g., residential treatment, in jail/prison)
 - 4. Use a hierarchy for research design. Only include second tier if no first tier are available
 - Tier 1: Use of a comparison group measuring outcomes over time (e.g., recovery support service vs. no recovery support service), including RCTs and quasi-experimental (e.g., comparison of two naturally formed groups)
 - Tier 2: Single group pre-post prospective or retrospective cross-sectional designs, other cross-sectional designs (note: if longitudinal, but involvement in recovery support service is measured at baseline as predictor of SUD outcome, like abstinence, this is considered cross-section, i.e., in Tier 2)
- 3.

B. Recovery community centers

Pubmed

((("Recovery community center"[Title/Abstract] OR "Recovery center"[Title/Abstract] OR "Recovery support center"[Title/Abstract] OR "Peer support center"[Title/Abstract] OR "Recovery community organization"[Title/Abstract] OR "Peer participatory model"[Title/Abstract])) AND ((recovery[Title/Abstract] OR remission[Title/Abstract] OR abstinence[Title/Abstract] OR "harm reduction"[Title/Abstract] OR "substance abuse"[Title/Abstract] OR "substance misuse"[Title/Abstract] OR "substance dependence"[Title/Abstract] OR "drug dependence"[Title/Abstract] OR "substance use disorder"[Title/Abstract] OR "alcohol use disorder"[Title/Abstract] OR "drug use disorder"[Title/Abstract] OR alcohol*[Title/Abstract] OR marijuana[Title/Abstract] OR "THC"[Title/Abstract] OR cannabis[Title/Abstract] OR cocaine[Title/Abstract] OR heroin[Title/Abstract] OR opioid*[Title/Abstract] OR opiate*[Title/Abstract] OR narcotic*[Title/Abstract] OR amphetamine*[Title/Abstract] OR methamphetamine*[Title/Abstract] OR benzodiazepene*[Title/Abstract] OR barbiturate*[Title/Abstract] OR hallucinogen*[Title/Abstract] OR inhalant*[Title/Abstract] OR steroid*[Title/Abstract] OR "club drug*[Title/Abstract] OR ecstasy[Title/Abstract] OR "MDMA"[Title/Abstract] OR stimulant*[Title/Abstract] OR cost-benefit[Title/Abstract] OR cost-offset[Title/Abstract] OR cost-effectiveness[Title/Abstract]) OR "cost benefit"[Title/Abstract] OR "cost offset"[Title/Abstract] OR "cost effectiveness"[Title/Abstract]))

Embase

('Recovery community center:ab,ti OR 'Recovery center:ab,ti OR 'Recovery support center:ab,ti OR 'Peer support center:ab,ti OR 'Recovery community organization:ab,ti OR 'Peer participatory model:ab,ti) AND (recovery:ab,ti OR remission:ab,ti OR abstinence:ab,ti OR 'harm reduction':ab,ti OR 'substance abuse':ab,ti OR 'substance misuse':ab,ti OR 'substance dependence':ab,ti OR 'drug dependence':ab,ti OR 'substance use disorder':ab,ti OR 'alcohol use disorder':ab,ti OR 'drug use disorder':ab,ti OR alcohol*:ab,ti OR marijuana:ab,ti OR 'THC':ab,ti OR cannabis:ab,ti OR cocaine:ab,ti OR heroin:ab,ti OR opioid*:ab,ti OR opiate*:ab,ti OR narcotic*:ab,ti OR amphetamine*:ab,ti OR methamphetamine*:ab,ti OR benzodiazepene*:ab,ti OR barbiturate*:ab,ti OR hallucinogen*:ab,ti OR inhalant*:ab,ti OR steroid*:ab,ti OR 'club drug*':ab,ti OR ecstasy:ab,ti OR 'MDMA':ab,ti OR stimulant*:ab,ti OR cost-benefit:ab,ti OR cost-offset:ab,ti OR cost-effectiveness:ab,ti OR 'cost benefit':ab,ti OR 'cost offset':ab,ti OR 'cost effectiveness':ab,ti)

CINAHL

AB ("Recovery community center" OR "Recovery center" OR "Recovery support center" OR "Peer support center" OR "Recovery community organization" OR "Peer participatory model") AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepene* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

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OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

TI ("Recovery community center" OR "Recovery center" OR "Recovery support center" OR "Peer support center" OR "Recovery community organization" OR "Peer participatory model") AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepene* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

TI ("Recovery community center" OR "Recovery center" OR "Recovery support center" OR "Peer support center" OR "Recovery community organization" OR "Peer participatory model") AND TI (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepene* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

CENTRAL (Cochrane Registry)

Same as for CINAHL

PsycINFO

Same as for CINAHL

Inclusion/Exclusion Criteria

1. Quantitative Data
2. Measured substance use outcome (abstinence, drinking intensity, consequences), other marker of SUD recovery (quality of life, psychiatric symptoms, etc.), and/or health care costs
3. Adolescent or adult – no limitations on age range
4. No coerced populations or studies where individuals are institutionalized while receiving the recovery support service (e.g., residential treatment, in jail/prison)
5. Use a hierarchy for research design. Only include second tier if no first tier are available
 - a. Tier 1: Use of a comparison group measuring outcomes over time (e.g., recovery support service vs. no recovery support service), including RCTs and quasi-experimental (e.g., comparison of two naturally formed groups)
 - b. Tier 2: Single group pre-post prospective or retrospective cross-sectional designs, other cross-sectional designs (note: if longitudinal, but involvement in recovery support service is measured at baseline as predictor of SUD outcome, like abstinence, this is considered cross-section, i.e., in Tier 2)

C. Recovery supports in educational settings

Pubmed

((("collegiate recovery"[Title/Abstract] OR "recovery school"[Title/Abstract] OR "recovery high school"[Title/Abstract] OR "recovery hous*"[Title/Abstract] OR "university-based recovery center"[Title/Abstract] OR "university based recovery center"[Title/Abstract])) AND ((recovery[Title/Abstract] OR remission[Title/Abstract] OR abstinence[Title/Abstract] OR "harm reduction"[Title/Abstract] OR "substance abuse"[Title/Abstract] OR "substance misuse"[Title/Abstract] OR "substance dependence"[Title/Abstract] OR "drug dependence"[Title/Abstract] OR "substance use disorder"[Title/Abstract] OR "alcohol use disorder"[Title/Abstract] OR "drug use disorder"[Title/Abstract] OR alcohol*[Title/Abstract] OR marijuana[Title/Abstract] OR "THC"[Title/Abstract] OR cannabis[Title/Abstract] OR cocaine[Title/Abstract] OR heroin[Title/Abstract] OR opioid*[Title/Abstract] OR opiate*[Title/Abstract] OR narcotic*[Title/Abstract] OR amphetamine*[Title/Abstract] OR methamphetamine*[Title/Abstract] OR benzodiazepine*[Title/Abstract] OR barbiturate*[Title/Abstract] OR hallucinogen*[Title/Abstract] OR inhalant*[Title/Abstract] OR steroid*[Title/Abstract] OR "club drug*"[Title/Abstract] OR ecstasy[Title/Abstract] OR "MDMA"[Title/Abstract] OR stimulant*[Title/Abstract] OR cost-benefit[Title/Abstract] OR cost-offset[Title/Abstract] OR cost-effectiveness[Title/Abstract]) OR "cost benefit"[Title/Abstract] OR "cost offset"[Title/Abstract] OR "cost effectiveness"[Title/Abstract]))

Embase

('collegiate recovery':ab,ti OR 'recovery school':ab,ti OR 'recovery high school':ab,ti OR 'recovery hous*':ab,ti OR 'university-based recovery center':ab,ti OR 'university based recovery center':ab,ti) AND (recovery:ab,ti OR remission:ab,ti OR abstinence:ab,ti OR 'harm reduction':ab,ti OR 'substance abuse':ab,ti OR 'substance misuse':ab,ti OR 'substance dependence':ab,ti OR 'drug dependence':ab,ti OR 'substance use disorder':ab,ti OR 'alcohol use disorder':ab,ti OR 'drug use disorder':ab,ti OR alcohol*:ab,ti OR marijuana:ab,ti OR 'THC':ab,ti OR cannabis:ab,ti OR cocaine:ab,ti OR heroin:ab,ti OR opioid*:ab,ti OR opiate*:ab,ti OR narcotic*:ab,ti OR amphetamine*:ab,ti OR methamphetamine*:ab,ti OR benzodiazepine*:ab,ti OR barbiturate*:ab,ti OR hallucinogen*:ab,ti OR inhalant*:ab,ti OR steroid*:ab,ti OR 'club drug*':ab,ti OR ecstasy:ab,ti OR 'MDMA':ab,ti OR stimulant*:ab,ti OR cost-benefit:ab,ti OR cost-offset:ab,ti OR cost-effectiveness:ab,ti OR 'cost benefit':ab,ti OR 'cost offset':ab,ti OR 'cost effectiveness':ab,ti)

CINAHL

AB ("collegiate recovery" OR "recovery school" OR "recovery high school" OR "recovery hous*" OR "university-based recovery center" OR "university based recovery center") AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

AB ("collegiate recovery" OR "recovery school" OR "recovery high school" OR "recovery hous*" OR "university-based recovery center" OR "university based recovery center") AND TI (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR

“MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

TI (“collegiate recovery” OR “recovery school” OR “recovery high school” OR “recovery hous*” OR “university-based recovery center” OR “university based recovery center”) AND AB (recovery OR remission OR abstinence OR "harm reduction" OR “substance abuse” OR “substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

TI (“collegiate recovery” OR “recovery school” OR “recovery high school” OR “recovery hous*” OR “university-based recovery center” OR “university based recovery center”) AND TI (recovery OR remission OR abstinence OR "harm reduction" OR “substance abuse” OR “substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

CENTRAL (Cochrane Registry)

Same as for CINAHL

PsycINFO

Same as for CINAHL

D. Mutual-help organizations

Pubmed

((("mutual help"[Title/Abstract] OR "mutual aid"[Title/Abstract] OR "self-help group"[Title/Abstract] OR "12 step"[Title/Abstract] OR "twelve step"[Title/Abstract] OR "Alcoholics Anonymous"[Title/Abstract] OR "Narcotics anonymous"[Title/Abstract] OR "Marijuana anonymous"[Title/Abstract] OR "Cocaine anonymous"[Title/Abstract] OR "Methamphetamine anonymous"[Title/Abstract] OR "Methadone anonymous"[Title/Abstract] OR "Al-anon"[Title/Abstract] OR "SMART Recovery"[Title/Abstract] OR "Moderation Management"[Title/Abstract] OR "Women for Sobriety"[Title/Abstract] OR "Secular Organizations for Sobriety"[Title/Abstract] OR "LifeRing"[Title/Abstract] OR "TSF"[Title/Abstract] OR "Intensive referral"[Title/Abstract])) AND ((recovery[Title/Abstract] OR remission[Title/Abstract] OR abstinence[Title/Abstract] OR "harm reduction"[Title/Abstract] OR "substance abuse"[Title/Abstract] OR "substance misuse"[Title/Abstract] OR "substance dependence"[Title/Abstract] OR "drug dependence"[Title/Abstract] OR "substance use disorder"[Title/Abstract] OR "alcohol use disorder"[Title/Abstract] OR "drug use disorder"[Title/Abstract] OR alcohol*[Title/Abstract] OR marijuana[Title/Abstract] OR "THC"[Title/Abstract] OR cannabis[Title/Abstract] OR cocaine[Title/Abstract] OR heroin[Title/Abstract] OR opioid*[Title/Abstract] OR opiate*[Title/Abstract] OR narcotic*[Title/Abstract] OR amphetamine*[Title/Abstract] OR methamphetamine*[Title/Abstract] OR benzodiazepine*[Title/Abstract] OR barbiturate*[Title/Abstract] OR hallucinogen*[Title/Abstract] OR inhalant*[Title/Abstract] OR steroid*[Title/Abstract] OR "club drug*[Title/Abstract] OR ecstasy[Title/Abstract] OR "MDMA"[Title/Abstract] OR stimulant*[Title/Abstract] OR cost-benefit[Title/Abstract] OR cost-offset[Title/Abstract] OR cost-effectiveness[Title/Abstract]) OR "cost benefit"[Title/Abstract] OR "cost offset"[Title/Abstract] OR "cost effectiveness"[Title/Abstract]))

Embase

('mutual help':ab,ti OR 'mutual aid':ab,ti OR 'self-help group':ab,ti OR '12 step':ab,ti OR 'Twelve step':ab,ti OR 'Alcoholics Anonymous':ab,ti OR 'Narcotics anonymous':ab,ti OR 'Marijuana anonymous':ab,ti OR 'Cocaine anonymous':ab,ti OR 'Methamphetamine anonymous':ab,ti OR 'Methadone anonymous':ab,ti OR 'Al-anon':ab,ti OR 'SMART Recovery':ab,ti OR 'Moderation Management':ab,ti OR 'Women for Sobriety':ab,ti OR 'Secular Organizations for Sobriety':ab,ti OR 'LifeRing':ab,ti OR 'TSF':ab,ti OR 'Intensive referral':ab,ti) AND (recovery:ab,ti OR remission:ab,ti OR abstinence:ab,ti OR 'harm reduction':ab,ti OR 'substance abuse':ab,ti OR 'substance misuse':ab,ti OR 'substance dependence':ab,ti OR 'drug dependence':ab,ti OR 'substance use disorder':ab,ti OR 'alcohol use disorder':ab,ti OR 'drug use disorder':ab,ti OR alcohol*:ab,ti OR marijuana:ab,ti OR 'THC':ab,ti OR cannabis:ab,ti OR cocaine:ab,ti OR heroin:ab,ti OR opioid*:ab,ti OR opiate*:ab,ti OR narcotic*:ab,ti OR amphetamine*:ab,ti OR methamphetamine*:ab,ti OR benzodiazepine*:ab,ti OR barbiturate*:ab,ti OR hallucinogen*:ab,ti OR inhalant*:ab,ti OR steroid*:ab,ti OR 'club drug*':ab,ti OR ecstasy:ab,ti OR 'MDMA':ab,ti OR stimulant*:ab,ti OR cost-benefit:ab,ti OR cost-offset:ab,ti OR cost-effectiveness:ab,ti OR 'cost benefit':ab,ti OR 'cost offset':ab,ti OR 'cost effectiveness':ab,ti)

CINAHL

AB ("Mutual help" OR "Mutual aid" OR "Self-help group" OR "12 step" OR "Twelve step" OR "Alcoholics Anonymous" OR "Narcotics anonymous" OR "Marijuana anonymous" OR "Cocaine anonymous" OR "Methamphetamine anonymous" OR "Methadone anonymous" OR "Al-anon" OR "SMART Recovery" OR "Moderation Management" OR "Women for Sobriety" OR "Secular Organizations for Sobriety" OR "LifeRing" OR "TSF" OR "Intensive referral") AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR

hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

AB (“Mutual help” OR “Mutual aid” OR “Self-help group” OR “12 step” OR “Twelve step” OR “Alcoholics Anonymous” OR “Narcotics anonymous” OR “Marijuana anonymous” OR “Cocaine anonymous” OR “Methamphetamine anonymous” OR “Methadone anonymous” OR “Al-anon” OR “SMART Recovery” OR “Moderation Management” OR “Women for Sobriety” OR “Secular Organizations for Sobriety” OR “LifeRing” OR “TSF” OR “Intensive referral”) AND TI (recovery OR remission OR abstinence OR "harm reduction" OR “substance abuse” OR “substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

TI “Mutual help” OR “Mutual aid” OR “Self-help group” OR “12 step” OR “Twelve step” OR “Alcoholics Anonymous” OR “Narcotics anonymous” OR “Marijuana anonymous” OR “Cocaine anonymous” OR “Methamphetamine anonymous” OR “Methadone anonymous” OR “Al-anon” OR “SMART Recovery” OR “Moderation Management” OR “Women for Sobriety” OR “Secular Organizations for Sobriety” OR “LifeRing” OR “TSF” OR “Intensive referral”) AND AB (recovery OR remission OR abstinence OR "harm reduction" OR “substance abuse” OR “substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

TI “Mutual help” OR “Mutual aid” OR “Self-help group” OR “12 step” OR “Twelve step” OR “Alcoholics Anonymous” OR “Narcotics anonymous” OR “Marijuana anonymous” OR “Cocaine anonymous” OR “Methamphetamine anonymous” OR “Methadone anonymous” OR “Al-anon” OR “SMART Recovery” OR “Moderation Management” OR “Women for Sobriety” OR “Secular Organizations for Sobriety” OR “LifeRing” OR “TSF” OR “Intensive referral”) AND TI (recovery OR remission OR abstinence OR "harm reduction" OR “substance abuse” OR “substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

CENTRAL (Cochrane Registry)

Same as for CINAHL

PsycINFO

Same as for CINAHL

Inclusion/Exclusion Criteria

1. Quantitative Data
2. Measured substance use outcome (abstinence, drinking intensity, consequences), other marker of SUD recovery (quality of life, psychiatric symptoms, etc.), and/or health care costs
3. Adolescent or adult – no limitations on age range

4. No coerced populations or studies where individuals are institutionalized while receiving the recovery support service (e.g., residential treatment, in jail/prison)
5. Use a hierarchy for research design. Only include second tier if no first tier are available – updated based on our meeting on July 25, 2017:
 - a. Tier 1: RCTs
 - b. Tier 2: non-RCTs with use of a comparison group measuring outcomes over time (e.g., recovery support service vs. no recovery support service), including quasi-experimental (e.g., comparison of two naturally formed groups)
 - c. Tier 3: Single group pre-post prospective
 - d. Tier 4: Retrospective cross-sectional designs, other cross-sectional designs (note: if longitudinal, but involvement in recovery support service is measured at baseline as predictor of SUD outcome, like abstinence, this is considered cross-section, i.e., in Tier 2)
 - e. Tier 5: Qualitative

Included studies will include randomized controlled trials, quasi-experimental studies, and other research and evaluation designs that include a comparison condition. If no studies are found in our systematic search at this top-tier level of scientific rigor, the review summarizes the next tier of available rigorous scientific evidence; namely, single-group pre-post research designs and longitudinal correlational and observational studies. Failing the availability of this level of evidence, descriptive, cross-sectional, and systematic qualitative studies will be evaluated and summarized.

E. Recovery Housing

Pubmed

((("oxford house"[Title/Abstract] OR "oxford home"[Title/Abstract] OR "sober living"[Title/Abstract] OR "sober living ho*"[Title/Abstract] OR "sober living environment"[Title/Abstract] OR "recovery residence"[Title/Abstract] OR "halfway house"[Title/Abstract] OR "halfway residence"[Title/Abstract] OR "transitional house"[Title/Abstract] OR domiciliary[Title/Abstract] OR "wet house"[Title/Abstract] OR "dry house"[Title/Abstract])) AND ((recovery[Title/Abstract] OR remission[Title/Abstract] OR abstinence[Title/Abstract] OR "harm reduction"[Title/Abstract] OR "substance abuse"[Title/Abstract] OR "substance misuse"[Title/Abstract] OR "substance dependence"[Title/Abstract] OR "drug dependence"[Title/Abstract] OR "substance use disorder"[Title/Abstract] OR "alcohol use disorder"[Title/Abstract] OR "drug use disorder"[Title/Abstract] OR alcohol*[Title/Abstract] OR marijuana[Title/Abstract] OR "THC"[Title/Abstract] OR cannabis[Title/Abstract] OR cocaine[Title/Abstract] OR heroin[Title/Abstract] OR opioid*[Title/Abstract] OR opiate*[Title/Abstract] OR narcotic*[Title/Abstract] OR amphetamine*[Title/Abstract] OR methamphetamine*[Title/Abstract] OR benzodiazepine*[Title/Abstract] OR barbiturate*[Title/Abstract] OR hallucinogen*[Title/Abstract] OR inhalant*[Title/Abstract] OR steroid*[Title/Abstract] OR "club drug*"[Title/Abstract] OR ecstasy[Title/Abstract] OR "MDMA"[Title/Abstract] OR stimulant*[Title/Abstract] OR cost-benefit[Title/Abstract] OR cost-offset[Title/Abstract] OR cost-effectiveness[Title/Abstract]) OR "cost benefit"[Title/Abstract] OR "cost offset"[Title/Abstract] OR "cost effectiveness"[Title/Abstract]))

Embase

('oxford house':ab,ti OR 'oxford home':ab,ti OR 'sober living':ab,ti OR 'sober living ho*':ab,ti OR 'sober living environment':ab,ti OR 'recovery residence':ab,ti OR 'halfway house':ab,ti OR 'halfway residence':ab,ti OR 'transitional house':ab,ti OR domiciliary:ab,ti OR 'wet house':ab,ti OR 'dry house':ab,ti) AND (recovery:ab,ti OR remission:ab,ti OR abstinence:ab,ti OR 'harm reduction':ab,ti OR 'substance abuse':ab,ti OR 'substance misuse':ab,ti OR 'substance dependence':ab,ti OR 'drug dependence':ab,ti OR 'substance use disorder':ab,ti OR 'alcohol use disorder':ab,ti OR 'drug use disorder':ab,ti OR alcohol*:ab,ti OR marijuana:ab,ti OR 'THC':ab,ti OR cannabis:ab,ti OR cocaine:ab,ti OR heroin:ab,ti OR opioid*:ab,ti OR opiate*:ab,ti OR narcotic*:ab,ti OR amphetamine*:ab,ti OR methamphetamine*:ab,ti OR benzodiazepine*:ab,ti OR barbiturate*:ab,ti OR hallucinogen*:ab,ti OR inhalant*:ab,ti OR steroid*:ab,ti OR 'club drug*':ab,ti OR ecstasy:ab,ti OR 'MDMA':ab,ti OR stimulant*:ab,ti OR cost-benefit:ab,ti OR cost-offset:ab,ti OR cost-effectiveness:ab,ti OR 'cost benefit':ab,ti OR 'cost offset':ab,ti OR 'cost effectiveness':ab,ti)

CINAHL

AB ("oxford house" OR "oxford home" OR "sober living" OR "sober living ho*" OR "sober living environment" OR "recovery residence" OR "halfway house" OR "halfway residence" OR "transitional house" OR domiciliary OR "wet house" OR "dry house") AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

AB ("oxford house" OR "oxford home" OR "sober living" OR "sober living ho*" OR "sober living environment" OR "recovery residence" OR "halfway house" OR "halfway residence" OR "transitional house" OR domiciliary OR "wet house" OR "dry house") AND TI (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR

opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

TI (“oxford house” OR “oxford home” OR “sober living” OR “sober living ho*” OR “sober living environment” OR “recovery residence” OR “halfway house” OR “halfway residence” OR “transitional house” OR domiciliary OR “wet house” OR “dry house”) AND AB (recovery OR remission OR abstinence OR "harm reduction" OR “substance abuse” OR “substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

TI (“oxford house” OR “oxford home” OR “sober living” OR “sober living ho*” OR “sober living environment” OR “recovery residence” OR “halfway house” OR “halfway residence” OR “transitional house” OR domiciliary OR “wet house” OR “dry house”) AND TI (recovery OR remission OR abstinence OR "harm reduction" OR “substance abuse” OR “substance misuse” OR “substance dependence” OR “drug dependence” OR “substance use disorder” OR “alcohol use disorder” OR “drug use disorder” OR alcohol* OR marijuana OR “THC” OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR “club drug*” OR ecstasy OR “MDMA” OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR “cost benefit” OR “cost offset” OR “cost effectiveness”)

CENTRAL (Cochrane Registry)

Same as for CINAHL

PsycINFO

Same as for CINAHL

Inclusion/Exclusion Criteria

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2. Measured substance use outcome (abstinence, drinking intensity, consequences), other marker of SUD recovery (quality of life, psychiatric symptoms, etc.), and/or health care costs
3. Adolescent or adult – no limitations on age range
4. No coerced populations or studies where individuals are institutionalized while receiving the recovery support service (e.g., residential treatment, in jail/prison)
5. Use a hierarchy for research design. Only include second tier if no first tier are available
 - a. Tier 1: Use of a comparison group measuring outcomes over time (e.g., recovery support service vs. no recovery support service), including RCTs and quasi-experimental (e.g., comparison of two naturally formed groups)
 - b. Tier 2: Single group pre-post prospective or retrospective cross-sectional designs, other cross-sectional designs (note: if longitudinal, but involvement in recovery support service is measured at baseline as predictor of SUD outcome, like abstinence, this is considered cross-section, i.e., in Tier 2).

F. Clinical models of continuing care

Pubmed

((("continuing care"[Title/Abstract] OR aftercare[Title/Abstract] OR "recovery monitoring"[Title/Abstract] OR "recovery management check up"[Title/Abstract] OR "recovery management check-up"[Title/Abstract] OR "recovery management checkup"[Title/Abstract] OR re-intervention[Title/Abstract]) AND ((recovery[Title/Abstract] OR remission[Title/Abstract] OR abstinence[Title/Abstract] OR "harm reduction"[Title/Abstract] OR "substance abuse"[Title/Abstract] OR "substance misuse"[Title/Abstract] OR "substance dependence"[Title/Abstract] OR "drug dependence"[Title/Abstract] OR "substance use disorder"[Title/Abstract] OR "alcohol use disorder"[Title/Abstract] OR "drug use disorder"[Title/Abstract] OR alcohol*[Title/Abstract] OR marijuana[Title/Abstract] OR "THC"[Title/Abstract] OR cannabis[Title/Abstract] OR cocaine[Title/Abstract] OR heroin[Title/Abstract] OR opioid*[Title/Abstract] OR opiate*[Title/Abstract] OR narcotic*[Title/Abstract] OR amphetamine*[Title/Abstract] OR methamphetamine*[Title/Abstract] OR benzodiazepine*[Title/Abstract] OR barbiturate*[Title/Abstract] OR hallucinogen*[Title/Abstract] OR inhalant*[Title/Abstract] OR steroid*[Title/Abstract] OR "club drug"[Title/Abstract] OR ecstasy[Title/Abstract] OR "MDMA"[Title/Abstract] OR stimulant*[Title/Abstract] OR cost-benefit[Title/Abstract] OR cost-offset[Title/Abstract] OR cost-effectiveness[Title/Abstract]) OR "cost benefit"[Title/Abstract] OR "cost offset"[Title/Abstract] OR "cost effectiveness"[Title/Abstract]))

Embase

('continuing care':ab,ti OR aftercare:ab,ti OR 'recovery monitoring':ab,ti OR 'recovery management check up':ab,ti OR 'recovery management check-up':ab,ti OR 'recovery management checkup':ab,ti OR re-intervention:ab,ti) AND (recovery:ab,ti OR remission:ab,ti OR abstinence:ab,ti OR 'harm reduction':ab,ti OR 'substance abuse':ab,ti OR 'substance misuse':ab,ti OR 'substance dependence':ab,ti OR 'drug dependence':ab,ti OR 'substance use disorder':ab,ti OR 'alcohol use disorder':ab,ti OR 'drug use disorder':ab,ti OR alcohol*:ab,ti OR marijuana:ab,ti OR 'THC':ab,ti OR cannabis:ab,ti OR cocaine:ab,ti OR heroin:ab,ti OR opioid*:ab,ti OR opiate*:ab,ti OR narcotic*:ab,ti OR amphetamine*:ab,ti OR methamphetamine*:ab,ti OR benzodiazepine*:ab,ti OR barbiturate*:ab,ti OR hallucinogen*:ab,ti OR inhalant*:ab,ti OR steroid*:ab,ti OR 'club drug':ab,ti OR ecstasy:ab,ti OR 'MDMA':ab,ti OR stimulant*:ab,ti OR cost-benefit:ab,ti OR cost-offset:ab,ti OR cost-effectiveness:ab,ti OR 'cost benefit':ab,ti OR 'cost offset':ab,ti OR 'cost effectiveness':ab,ti)

CINAHL

AB ("continuing care" OR aftercare OR "recovery monitoring" OR "recovery management check up" OR "recovery management check-up" OR "recovery management checkup" OR re-intervention) AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

AB ("continuing care" OR aftercare OR "recovery monitoring" OR "recovery management check up" OR "recovery management check-up" OR "recovery management checkup" OR re-intervention) AND TI (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*")

OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

TI ("continuing care" OR aftercare OR "recovery monitoring" OR "recovery management check up" OR "recovery management check-up" OR "recovery management checkup" OR re-intervention) AND AB (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

TI ("continuing care" OR aftercare OR "recovery monitoring" OR "recovery management check up" OR "recovery management check-up" OR "recovery management checkup" OR re-intervention) AND TI (recovery OR remission OR abstinence OR "harm reduction" OR "substance abuse" OR "substance misuse" OR "substance dependence" OR "drug dependence" OR "substance use disorder" OR "alcohol use disorder" OR "drug use disorder" OR alcohol* OR marijuana OR "THC" OR cannabis OR cocaine OR heroin OR opioid* OR opiate* OR narcotic* OR amphetamine* OR methamphetamine* OR benzodiazepine* OR barbiturate* OR hallucinogen* OR inhalant* OR steroid* OR "club drug*" OR ecstasy OR "MDMA" OR stimulant* OR cost-benefit OR cost-offset OR cost-effectiveness OR "cost benefit" OR "cost offset" OR "cost effectiveness")

CENTRAL (Cochrane Registry)

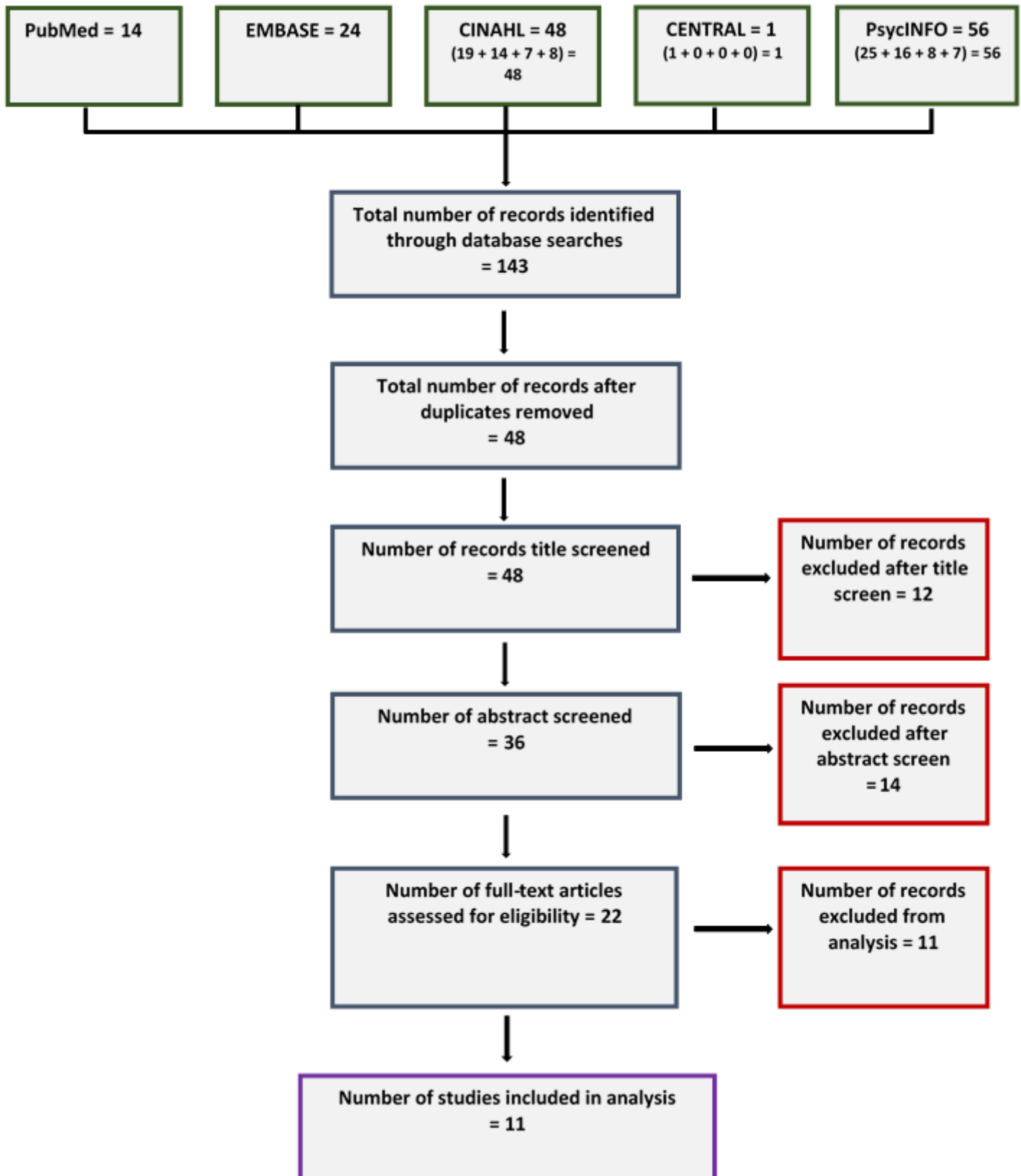
Same as for CINAHL

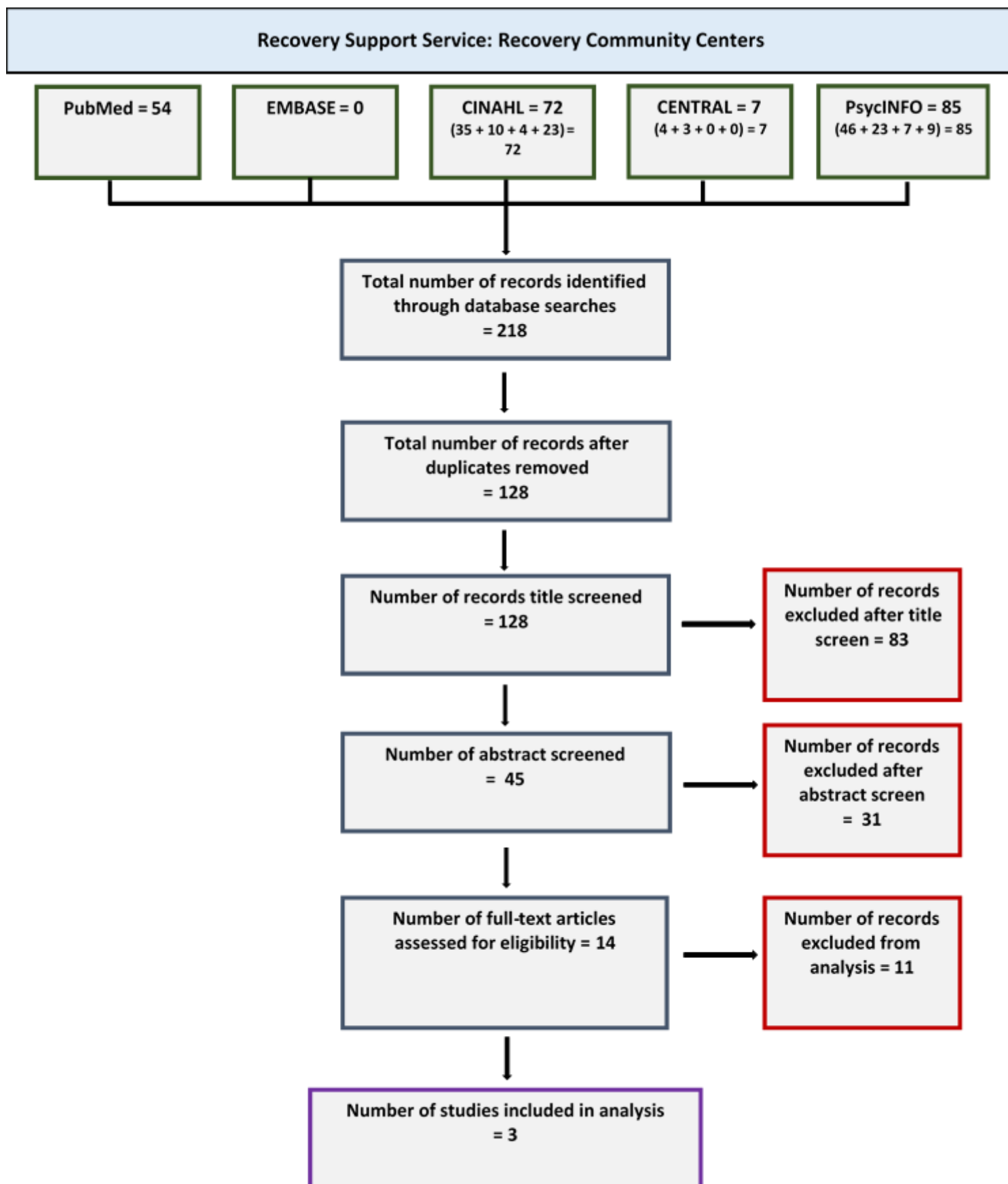
PsycINFO

Same as for CINAHL

APPENDIX B: SYSTEMATIC REVIEW FLOW CHARTS

Recovery Support Service: Peer-based Recovery Support Services





Recovery Support Service: Recovery Supports in Educational Settings

PubMed = 8

EMBASE = 71

CINAHL = 132
(43 + 31 + 25 + 33)
= 132

CENTRAL = 17
(8 + 4 + 2 + 3) = 17

PsycINFO = 254
(95 + 71 + 44 + 44) =
254

Total number of records identified
through database searches
= 482

Total number of records after
duplicates removed
= 154

Number of records title screened
= 154

Number of records
excluded after title
screen = 70

Number of abstract screened
= 84

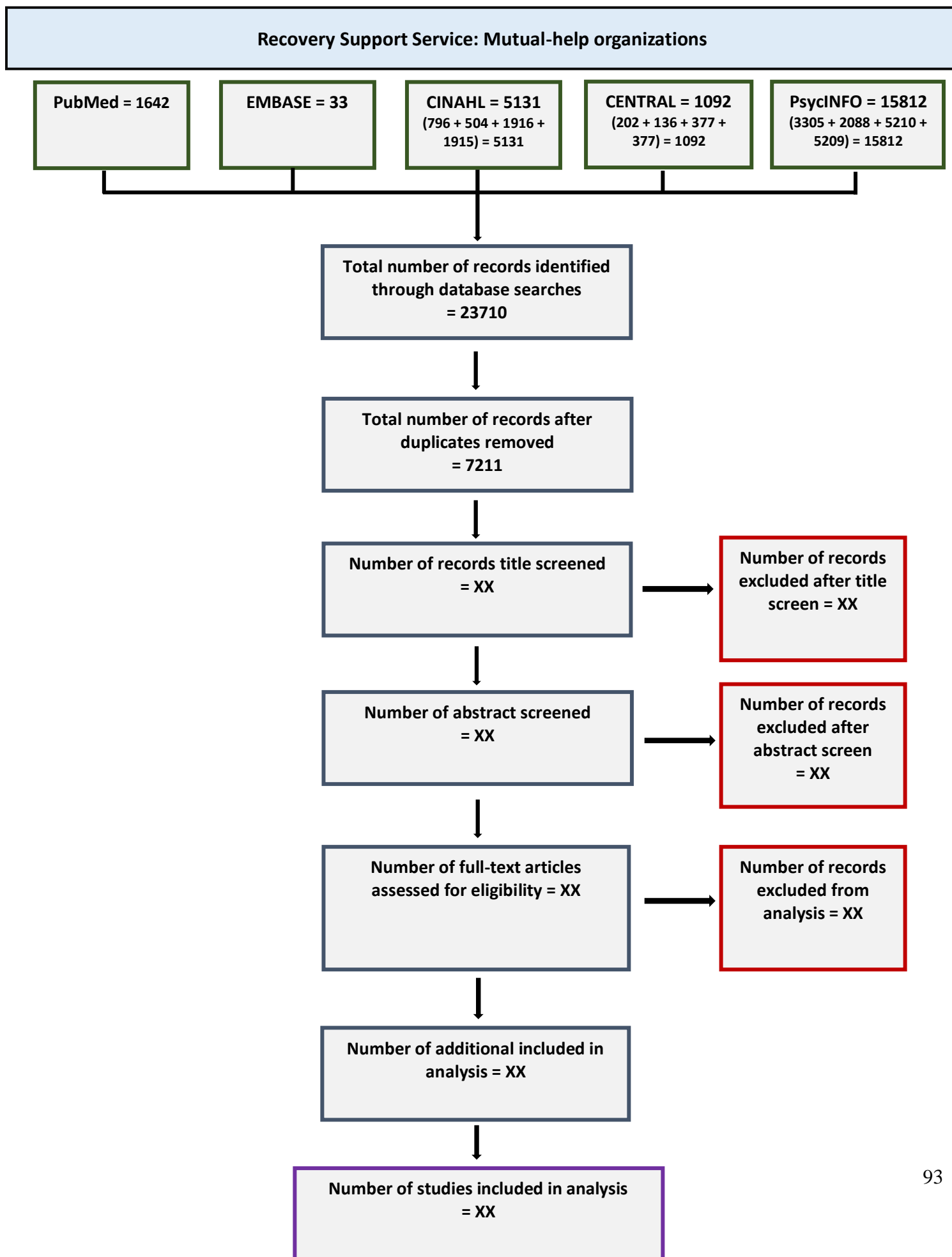
Number of records
excluded after
abstract screen
= 74

Number of full-text articles
assessed for eligibility = 10

Number of records
excluded from
analysis = 3

Number of additional included in
analysis = 1

Number of studies included in analysis
= 11



Recovery Support Service: Recovery Housing

PubMed = 291

EMBASE = 370

CINAHL = 192
(91 + 39 + 36 + 26)
= 192

CENTRAL = 74
(37 + 13 + 16 + 8)
= 74

PsycINFO = 508
(232 + 137 + 91 + 48)
= 508

Total number of records identified
through database searches
= 1435

Total number of records after
duplicates removed
= 573

Number of records title screened
= 565

Number of records
excluded after title
screen = 305

Number of abstract screened
= 260

Number of records
excluded after
abstract screen
= 138

Number of full-text articles
assessed for eligibility = 119

Number of records
excluded from
analysis = 104

Number of additional included in
analysis = 3

Number of studies included in analysis
= 18

Recovery Support Service: Clinical Models of Continuing Care

PubMed = 986

EMBASE = 1347

CINAHL = 635
(325 + 157 + 82 +
71) = 635

CENTRAL = 475
(203 + 123 + 78 +
71) = 475

PsycINFO = 1955
(992 + 565 + 242 +
156) = 1955

Total number of records identified
through database searches
= 5398

Total number of records after
duplicates removed
= 1968

Number of records title screened
= 1968

Number of records
excluded after title
screen = 1448

Number of abstract screened
= 520

Number of records
excluded after
abstract screen
= 429

Number of studies included in
analysis = 57
Number of full-text assessed for
eligibility = 23

Number of records
excluded from
analysis = 14

Number of additional included in
analysis = 4

Number of studies included in analysis
= 70