

Interventions to Improve the Health of the Homeless

A Systematic Review

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Background: Homelessness is a widespread problem in the United States. The primary goal of this systematic review is to provide guidance in the development and organization of programs to improve the health of homeless people.

Methods: MEDLINE, CINAHL, HealthStar, PsycINFO, Sociological Abstracts, and Social Services Abstracts databases were searched from their inception through July 2004 using the following terms: homeless, homeless persons, and homelessness. References of key articles were also searched. 4564 abstracts were screened, and 258 articles underwent full review. Seventy-three studies conducted from 1988 to 2004 met inclusion criteria (use of an intervention, use of a comparison group, and the reporting of health-related outcomes). Two authors independently abstracted data from studies and assigned quality ratings using explicit criteria.

Results: Forty-five studies were rated good or fair quality. For homeless people with mental illness, case management linked to other services was effective in improving psychiatric symptoms, and assertive case management was effective in decreasing psychiatric hospitalizations and increasing outpatient contacts. For homeless people with substance abuse problems, case management resulted in greater decreases in substance use than did usual care. For homeless people with latent tuberculosis, monetary incentives improved adherence rates. Although a number of studies comparing an intervention to usual care were positive, studies comparing two interventions frequently found no significant difference in outcomes.

Conclusions: Coordinated treatment programs for homeless adults with mental illness or substance abuse usually result in better health outcomes than usual care. Health care for homeless people should be provided through such programs whenever possible. Research is lacking on interventions for youths, families, and conditions other than mental illness or substance abuse.

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Introduction

Homelessness is a widespread problem in the United States, with >800,000 individuals currently homeless.¹ Earlier studies have estimated that 5 million to 8 million Americans experienced homelessness within the last 5 years,² and about 1.0% of Philadelphians and 1.2% of New Yorkers stayed at a homeless shelter each year.³ Homelessness affects people of all ages: adolescents, adult men, adult women, and families with children account for 9%,

60%, 16%, and 15% of the U.S. homeless population, respectively.¹

Homeless people often suffer from serious health conditions.⁴ In a cross-sectional study, 43% of homeless people in the United States had either a mental health or a substance use problem, and an additional 23% had concurrent mental health and substance use problems.¹ Injuries, assault, cold exposure, and skin problems are common hazards of life on the street.^{5–7} Infectious diseases, including tuberculosis, HIV, hepatitis, and sexually transmitted diseases, occur at higher than average rates.^{8–14} Chronic medical conditions, including hypertension and diabetes, are often poorly controlled.¹⁵ Pregnancy is common among adolescent girls,¹⁶ and homeless children are at increased risk for asthma and behavioral disorders.^{17,18} More than half of all homeless people in the United States lack health insurance and face major barriers to obtaining care.¹⁹ Not surprisingly, mortality rates among homeless peo-

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ple are greatly elevated.^{20–22} As a result of their complex health issues and lack of stable housing, homeless patients present serious challenges to healthcare providers.²³

The development and support of programs to improve the health of homeless people should therefore be an important priority. However, an evidence-based approach is required to identify interventions that result in demonstrable health benefits. To date, no comprehensive and rigorous survey has been undertaken of the literature in this area.

The primary goal of this systematic review is to summarize the existing evidence on interventions to improve health-related outcomes in homeless people. This information will help guide healthcare and social service providers and government agencies as they seek to identify effective means to assist this population. Furthermore, this knowledge will reduce the likelihood of replicating previously unsuccessful efforts. Recognizing that the literature in this area varies widely in methodologic rigor, this review evaluates the quality of each study using explicit and well-validated criteria. Secondary goals of this review are to identify major gaps in the existing knowledge base of interventions for the homeless, and to provide insights into methodologic pitfalls that future researchers should seek to avoid.

Methods

Data Sources

MEDLINE, CINAHL, HealthStar, PsycINFO, Sociological Abstracts, and Social Services Abstracts databases were searched from their inception through July 2004 using the following terms: homeless persons, homelessness, and homeless. Title and abstract of each article were reviewed and placed into a keep or reject database based on predetermined criteria. A second investigator reviewed these databases, a third investigator arbitrated disagreement, and consensus was reached after discussion. To identify additional articles, the bibliographies of relevant reviews and all articles meeting final selection criteria were searched. A total of 4564 articles were identified.

Study Selection

Studies were included if they examined the effectiveness of an intervention to improve the health of homeless people. Interventions were broadly defined to include both services that a primary care provider could provide and programs to which homeless patients could be referred. Studies had to compare homeless subjects who received an intervention to subjects who received either no intervention (usual care) or a different intervention, and they had to report data on health-related outcomes. Acceptable study designs included randomized controlled trials (RCTs), prospective longitudinal studies with nonrandomized allocation to different treatment groups, retrospective studies with comparison of outcomes among groups receiving different treatments, and secondary analyses of RCT data in which the examined intervention was

not the one randomly allocated in the original RCT. Articles published in English in peer-reviewed journals were eligible; abstracts, commentaries, and preliminary reports were excluded.

Homeless persons were defined as individuals who lack a fixed, regular, and adequate night-time residence, including people living in supervised shelters or places not intended for human habitation.²⁴ Some studies enrolled homeless and nonhomeless subjects; because none of these studies reported results separately for homeless subjects, they were included only if at least one-half of the subjects were homeless. Health-related outcomes were defined as measures of physical health; mental health (including psychiatric symptoms and psychological or cognitive function); substance use (alcohol, drugs, or tobacco); HIV risk behaviors; healthcare utilization; adherence to health care; and quality of life. Studies that reported only housing or employment outcomes were excluded.

Critical Appraisal Process

A total of 258 articles appeared to potentially match selection criteria based on title and abstract. Two investigators independently reviewed these articles. When multiple articles reported different outcome measures on the same subjects, data from the articles were combined. Disagreements regarding inclusion or exclusion were resolved by consensus after discussion with a third investigator. After full review, 174 articles were excluded for the following reasons: no intervention examined ($n=30$), no comparison group ($n=56$), no health outcomes reported ($n=41$), less than one half of subjects homeless ($n=26$), duplicate publications ($n=17$), and other reasons ($n=4$). Seventy-three studies (reported in 84 articles published from 1988 to 2004) met inclusion criteria and underwent data abstraction and critical appraisal. Nine of these studies included some subjects who were not homeless at the time of enrollment.

Two investigators independently abstracted data and rated the quality of each article using guidelines developed by the U.S. Preventive Services Task Force Work Group (Appendix A, available at: www.ajpm-online.net).²⁵ In a modification of these guidelines, studies that did not use an intention-to-treat analysis were rated “fair” rather than “poor.” Results from secondary analyses of “good” quality studies were considered “fair” quality. Disagreements regarding quality ratings were resolved after discussion among all investigators.

Studies were categorized by the subpopulation of homeless persons targeted for intervention, and then subcategorized by the type of intervention. Two investigators prepared a preliminary data synthesis and draft of conclusions. All investigators conferred to discuss these documents, make revisions, and reach unanimous final conclusions.

Results

Quality and Categorization of Studies

The database search and study selection process is summarized in [Figure 1](#). Of 73 included studies, 13 were rated as good quality, 32 were fair, and 28 were poor. The most common reasons for poor quality ratings were small sample size (<50 subjects per group)

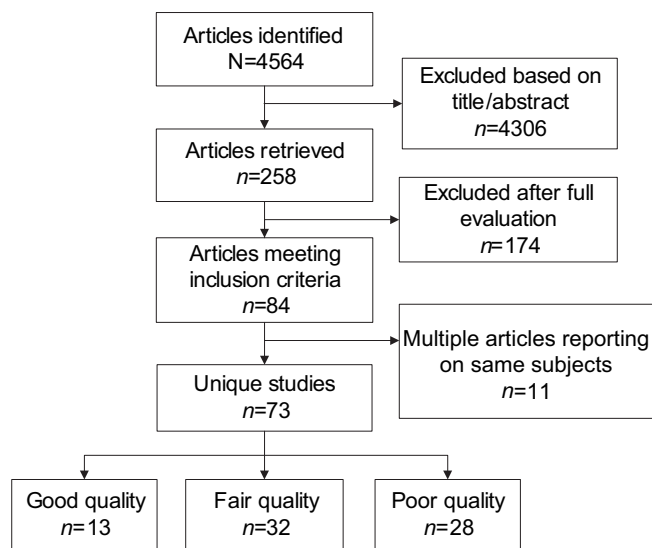


Figure 1. Summary of database search and study selection process.

and low follow-up rates (<50% overall). Studies with a quality rating of good or fair are summarized in Table 1, categorized by the subpopulation targeted and the type of intervention examined.

Interventions for Homeless People with Mental Illness

Detailed information on these studies is given in Appendix B (available online at www.ajpm-online.net). Five studies examined case management services and/or supported housing. One RCT found that intensive case management with access to drop-in center services, temporary housing, and rehabilitation services resulted in greater improvements in psychiatric symptoms and quality of life, compared to usual care.²⁶ A longitudinal cohort study of clients receiving outreach, case management, and residential treatment found that having more contacts with the program was associated with greater improvements in psychological distress and greater reductions in alcohol and drug problems.²⁷ A retrospective study compared homeless people who had severe mental illness and were placed in supportive housing with matched controls not placed in housing, and found that the intervention group had significantly reduced inpatient and outpatient healthcare utilization after being housed.²⁸

Two studies examined the effect of housing interventions in persons receiving case management. In the first study, individuals were randomized to supported living in either group housing or individual apartments.^{29–31} A second study compared outcomes among subjects receiving case management who were either provided guaranteed housing or given assistance in finding their own housing.³² Both of these studies were essentially negative in terms of health-related outcomes.

Three RCTs^{33–35} assessed the effectiveness of assertive community treatment (ACT), in which a team of psychiatrists, nurses, and social workers with a low client-to-staff ratio provided comprehensive psychiatric care, medication monitoring, intensive case management, and crisis intervention in the community. One of the studies found that ACT was superior to usual care in reducing psychiatric hospitalizations, but not in improving psychiatric symptoms or quality of life.³³ Another study³⁴ found that ACT was superior to brokered case management in improving certain psychiatric symptoms. An older study found that ACT was superior to drop-in center services or outpatient clinic care in increasing program contacts, but not in improving psychiatric symptoms or substance use.³⁵

Six studies^{36–41} reported findings from the Access to Community Care and Effective Services and Supports (ACCESS) program, whose primary goal was to determine if greater integration and coordination among agencies within service systems improved outcomes among mentally ill homeless people receiving ACT.³⁶ Clients at all sites experienced improvements in mental health and substance use problems. At intervention sites, increased integration among service agencies was achieved but did not affect individual-level health outcomes.³⁶ Four substudies^{38–41} showed that the following factors had no effect on outcomes: client selection of ACT (after the client was offered a choice of programs) versus assignment of the client to ACT by a case worker (with no choice of programs offered),³⁷ assignment to a consumer case manager (a person with a history of treatment for serious mental illness) versus a case manager with no such history,³⁸ and ethnic/racial concordance between client and case manager.^{39,40} When ACT teams used clinical judgment to discharge clients to less-intensive service programs at various points over an 18-month period, clinical outcomes were similar among discharged and continuing clients.⁴¹

In one study,⁴² mentally ill veterans who were applying for Social Security benefits were followed prospectively. Fifty individuals were awarded benefits and 123 were denied benefits. Receipt of benefits was associated with significantly improved quality of life but had no effect on psychiatric, medical, alcohol, or drug problems.⁴²

Interventions for Homeless People with Substance Abuse

Detailed information on these studies is given in Appendix C (available online at www.ajpm-online.net). Six studies^{43–48} examined the effects of case management. Two studies^{43,44} compared case management to usual care and found that case management had a significant effect in reducing alcohol use and drug use. Two studies^{45,46} found that for individuals receiving inpa-

Table 1. Summary of studies with a quality rating of fair or good^a

Subpopulation	Intervention type
Homeless people with mental illness (<i>n</i> =15) ^b	Case management with access to other services; or case management with or without supportive housing (<i>n</i> =5) ²⁶⁻³² Assertive community treatment (ACT) (<i>n</i> =3) ³³⁻³⁵ ACT with or without service system integration (<i>n</i> =1) ³⁶ Client selection of ACT vs assignment to ACT (<i>n</i> =1) ³⁷ Consumer vs nonconsumer case manager (<i>n</i> =1) ³⁸ Client/case manager ethnic/racial concordance (<i>n</i> =2) ^{39,40} Discharge from ACT to less intensive program (<i>n</i> =1) ⁴¹ Approval of social security benefits (<i>n</i> =1) ⁴²
Homeless people with substance abuse (<i>n</i> =13) ^c	Case management (<i>n</i> =6) ⁴³⁻⁴⁸ Post-detoxification stabilization program (<i>n</i> =1) ⁴⁹ Abstinence-contingent work therapy (<i>n</i> =1) ⁵⁰ Intensive residential treatment program (<i>n</i> =1) ^{51,52} Therapeutic community (<i>n</i> =1) ⁵³ Other treatment programs (<i>n</i> =1) ⁵⁴ Accelerated hepatitis B immunizations (<i>n</i> =1) ⁵⁵ Smoking cessation program (<i>n</i> =1) ⁵⁶
Homeless people with concurrent mental illness and substance abuse (<i>n</i> =7) ^d	Integrated treatment program (<i>n</i> =2) ^{57,58} Therapeutic community (<i>n</i> =2) ⁵⁹⁻⁶¹ Abstinence-contingent housing and work therapy (<i>n</i> =1) ^{62,63} Housing First vs Continuum of Care (<i>n</i> =1) ^{64,65} Representative payee (<i>n</i> =1) ⁶⁶
Homeless people with latent tuberculosis (<i>n</i> =2) ^e	Cash and noncash incentives for clinic attendance (<i>n</i> =2) ⁶⁷⁻⁶⁹
Homeless or runaway youths (<i>n</i> =2) ^e	Educational program to reduce sexual risk behaviors for HIV infection (<i>n</i> =1) ^{70,71} Standard vs intensive case management (<i>n</i> =1) ⁷²
Homeless families and children (<i>n</i> =2) ^e	Therapeutic community for substance abusing mothers (<i>n</i> =1) ⁷³ Health advocate outreach worker (<i>n</i> =1) ^{74,75}
Homeless women (<i>n</i> =2) ^e	Educational program to reduce risk behaviors for HIV infection (<i>n</i> =2) ^{76,77}
Homeless people at emergency departments or admitted to hospital (<i>n</i> =2) ^e	Compassionate care from a volunteer in the emergency department (<i>n</i> =1) ⁷⁸ Post-hospital transitional care facility (<i>n</i> =1) ⁷⁹

Note: Appendixes are available online at www.ajpm-online.net.

^aFor detailed information on quality rating criteria, see Appendix A.

^bFor detailed information on each study, see Appendix B.

^cFor detailed information on each study, see Appendix C.

^dFor detailed information on each study, see Appendix D.

^eFor detailed information on each study, see Appendix E.

tient or outpatient substance abuse treatment, the addition of case management services had no significant effect on severity of alcohol or drug problems. Two RCTs^{47,48} compared high-intensity and low-intensity case management services and found no significant differences in mental health or substance use outcomes.

Two of the above studies^{44,48} assigned subjects to case management alone or case management with subsidized housing. The provision of housing had no effect on substance use in one study.⁴⁴ In the other,⁴⁸ it had a positive effect on quality of life, but no effect on substance use, psychiatric symptoms, or outpatient mental healthcare utilization.

In three studies⁴⁹⁻⁵² that compared usual care to postdetoxification stabilization,⁴⁹ abstinence-contingent work therapy,⁵⁰ or an intensive residential treatment program,^{51,52} the intervention groups had significantly greater reductions in substance use than the usual care groups. However, a study comparing thera-

peutic community to usual care found no significant effect on substance use.⁵³ Two studies^{47,54} compared different types of treatment programs. In these studies, no long-term differences in substance use were seen in subjects receiving case-managed residential care versus brief inpatient substance abuse treatment,⁵⁴ or in those receiving residential treatment versus shelter-based case management.⁴⁷

Two studies^{55,56} focused on preventive health interventions for homeless people with substance dependence. A study of homeless patients with a history of illicit drug use who were seen at a primary care center demonstrated that an accelerated schedule of three hepatitis B immunizations over 21 days resulted in higher completion rates than a standard schedule of immunizations given over 6 months.⁵⁵ Among residents of a therapeutic community for substance users, participation in a smoking-cessation program resulted in higher smoking abstinence rates at 2 months compared to usual care, but no significant differences in smoking

abstinence rates over the remainder of the 13-month follow-up period.⁵⁶

Interventions for Homeless People with Concurrent Mental Illness and Substance Abuse

Detailed information on these studies is given in Appendix D (available online at www.ajpm-online.net). Two studies^{57,58} compared integrated programs versus separate mental health and substance abuse programs to treat individuals with concurrent mental illness and substance abuse. Both studies found no significant effect on mental health or substance-use outcomes. Two studies^{59,60} focused on therapeutic communities. Compared to usual care, a modified therapeutic community yielded minimal effects (lower depression scores but no difference in other psychiatric symptoms, substance use, or risk behaviors for HIV). In a comparison of a therapeutic community and a psychosocial rehabilitation program, abstinence from substance use was higher among participants in the psychosocial rehabilitation program.⁶¹ A study^{62,63} comparing behavioral day treatment alone versus behavioral day treatment with abstinence-contingent housing and work therapy found higher rates of abstinence from drug use in the latter group at 2 and 6 months, but no significant difference at 12 months.

In one study,^{64,65} chronically homeless individuals with severe Axis I mental illness (90% of whom had a concurrent alcohol or substance abuse disorder) were randomized to a program providing immediate independent housing with the offer of nonmandatory ACT and housing support services ("Housing First") or a program providing transitional housing followed by permanent supportive housing, contingent on sobriety and adherence to psychiatric treatment. The Housing First group spent less time hospitalized, but there were no differences between the groups in terms of psychiatric symptoms or substance use. A longitudinal study found that the assignment of a representative payee to manage funds for individuals receiving ACT had no effect on substance use or psychiatric symptoms.⁶⁶

Interventions for Homeless People with Tuberculosis

Detailed information on these studies is given in Appendix E (available online at www.ajpm-online.net). Two good-quality studies focused on the treatment of latent tuberculosis (TB). Compared to usual care, a cash incentive increased adherence to an appointment for initial assessment of a positive tuberculin skin test.⁶⁷ In homeless people with latent TB receiving directly observed preventive therapy, cash incentives and non-cash vouchers at each visit were equally effective in increasing completion rates.^{68,69}

Interventions for Homeless or Runaway Youths

Detailed information on these studies is given in Appendix E (available online at www.ajpm-online.net). Two fair-quality studies focused on homeless youths. A study^{70,71} of an educational program intended to reduce sexual risk behaviors for HIV infection found that the number of educational sessions attended was significantly associated with reduced risk behaviors. In a study⁷² that randomized runaway youths using a drop-in center to standard case management (maximum of 30 clients per case manager) or intensive case management (maximum of 12 clients per case manager, access to flexible funds to help meet the youths' needs, and enhanced supervision and support for the case manager), no significant differences in outcomes were observed.

Interventions for Homeless Families and Children

Detailed information on these studies is given in Appendix E (available online at www.ajpm-online.net). Two studies⁷³ focused on homeless families and/or children. In one study, substance-abusing homeless mothers entered a modified therapeutic community. They and their families were randomized to live at the treatment site or to make their own living arrangements. Mothers in the two groups had similar reductions in drug use.

Some general practitioners in the United Kingdom are said to be reluctant to register homeless patients in their practice because of the extra workload entailed.⁷⁴ A study from the United Kingdom showed that, compared to usual care, outreach by a health advocate significantly reduced families' utilization of primary health care, even after controlling for baseline characteristics.⁷⁴ The health advocate appeared to improve health-related quality of life, but this analysis was conducted in only a small subgroup of subjects.⁷⁵

Homeless Women

Detailed information on these studies is given in Appendix E (available online at www.ajpm-online.net). Two RCTs examined educational programs intended to reduce HIV risk behaviors in homeless women. In one study,⁷⁶ whether the woman's partner participated in the program had no effect on mental health or HIV risk behavior outcomes. An educational program on coping strategies was associated with reduction in noninjection drug use, but had no effect on mental health, injection drug use, or sexual risk behaviors for HIV infection.⁷⁶ In another study,⁷⁷ an intensive educational intervention was compared to offering HIV testing with standard pre-test and post-test counseling. No differences were seen in terms of mental health outcomes or any risk behaviors for HIV infection.

Homeless People at Emergency Departments or Admitted to Hospitals

Detailed information on these studies is given in Appendix E (available online at www.ajpm-online.net). Two studies^{78,79} examined interventions to reduce the use of health services by homeless people in the hospital setting. In one study,⁷⁸ homeless adults at an emergency department were randomized to receive compassionate care from a visiting volunteer or usual care. Individuals who received the intervention were less likely to return to an emergency department over the next 8 months. A study of hospitalized homeless veterans⁷⁹ examined the impact of discharge to a post-hospital transitional care facility for homeless people on length of stay in hospital. After adjustment for illness severity and other characteristics, length of stay in hospital was not significantly different among homeless inpatients discharged to the transitional facility compared to nonhomeless inpatients discharged to their homes. The authors interpreted this as evidence of effectiveness, based on the assumption that homeless patients would normally stay in hospital longer than nonhomeless patients.

Discussion

Of >4500 articles on homelessness, <2% met inclusion criteria for this systematic review. A relatively small number of good- and fair-quality controlled studies are available to guide the selection of interventions to improve the health of homeless people. The evidence is most plentiful with respect to the treatment of homeless single adults with mental illness or substance abuse. Studies have examined a heterogeneous group of interventions for these individuals, in part due to regional differences in the characteristics and needs of homeless populations and the services available to them. Frequently, a specific intervention has been evaluated in only one good- or fair-quality controlled study. This heterogeneity often makes it difficult to identify a particular intervention as being clearly superior.

Limitations

This review has certain limitations. Interventions relevant to the care of homeless people were excluded unless they were evaluated in homeless subjects. For example, methadone maintenance is an effective intervention⁸⁰ that should be considered for opiate-dependent individuals who are homeless, even though no study has specifically examined its use in homeless subjects. Healthcare system and social policy interventions (e.g., the provision of universal health insurance or increased availability of subsidized housing) may have substantial effects on the health of homeless people, but controlled designs

are rarely used to examine such interventions. Analyses of the cost-effectiveness of interventions⁸¹ and the clinical significance of intervention effects were beyond the scope of this review. Finally, although only controlled studies were included in this review, other study designs may provide useful information on the effectiveness of interventions.

Implications for Clinical Care and Policy

The data reviewed here indicate that interventions providing coordinated treatment and support for homeless adults with mental illness and/or substance abuse usually result in greater improvements in health-related outcomes than does usual care. However, when two types of interventions are compared, often no significant differences are found. One possible explanation for this observation is that once programs surpass a modest threshold of service intensity, commonly used outcome measures may lack the sensitivity needed to detect differences between treatment groups. Overall, these findings suggest that clinicians should focus on ensuring that homeless people are able to receive health care through coordinated treatment and support programs that are specifically adapted to the needs of the homeless. Rather than focusing on identifying the “most effective” treatment modality, it is probably more important to simply ensure the availability of at least one modality that has been shown to be effective.

Service providers who work with homeless people face an important question: To what extent is moving an individual from homelessness to stable housing important or even necessary to improve his or her health? This review focused on the effect of interventions on homeless people’s health, although many of the interventions also reduced the amount of time that subjects spent homeless.^{26,28,33,35,43,44,48,50,64,66} Few controlled studies have examined the independent effect of providing supported or subsidized housing on the health of homeless individuals.^{28,32,44,46,48,64} Surprisingly, these studies have not demonstrated consistent effects on physical health, mental health, or substance use, although significant reductions in healthcare utilization have been observed in a few studies.^{28,64} This should not be viewed as an argument against programs that provide long-term housing for homeless people. The health outcome measures used in some of these investigations may not have been adequately sensitive to change. In addition, housing programs are critical to achieving the inherently worthwhile goal of ending homelessness, and they may be cost-effective in terms of cost per night of homelessness averted.⁴⁸

Implications for Research

Future research efforts should be broadened to reflect the diversity of the homeless population. Few con-

trolled studies have examined the treatment of conditions other than mental illness or substance abuse in single adults. Even more importantly, research has been lacking on interventions to meet the needs of runaway youths and homeless families and children. Given the opportunity to intervene at a formative stage in the life course, and the fact that these individuals constitute about one fourth of the U.S. homeless population,¹ further work in this area is clearly needed.

Investigators should consider the inclusion of usual care control groups in future studies. Some studies have assigned homeless individuals to two different interventions and observed statistically equivalent improvements in both groups; these studies were unable to reach definitive conclusions regarding the effectiveness of either intervention due to the possibility of "regression to the mean."⁸² Although researchers may cite ethical concerns or community resistance to using control groups, this review indicates that the pre-existing evidence for the superiority of a particular intervention is often quite limited.

The maximization of statistical power through adequate and balanced sample size in each study arm is critical. Based on data from positive RCTs included in this review,^{26,34,43,62} we estimate that a clinically meaningful and realistically achievable effect size (e.g., the between-group difference in the mean value of a continuous, normally distributed outcome variable) is likely to be approximately 0.5 of the within-group standard deviation. Using these assumptions, outcome data on 65 subjects in each group would be needed to achieve 80% power to detect a difference at $p < 0.05$. For studies examining categorical outcomes, an even greater number of subjects may be required. Thus, our requirement of ≥ 50 subjects per group to receive a quality rating of good or fair is not overly stringent. Many previous studies have had inadequate sample size, and their negative findings may reflect insufficient statistical power.

Given the high rates of loss to follow-up among homeless subjects, procedures to optimize tracking of participants are critical.^{83,84} In studies where the percentage of participants lost to follow-up varies greatly across treatment groups,^{32,35,48,61} bias may result if loss to follow-up is systematically related to outcome status. Some studies have reported only health status, substance use, or healthcare utilization outcomes; future studies should report multiple outcomes to allow a comprehensive assessment of intervention effects.

In conclusion, effective interventions to improve the health of individuals experiencing homelessness are urgently needed. Findings from this systematic review can help guide clinicians, researchers, and policymakers as they design, implement, and evalu-

ate such interventions. This work should be linked to continuing efforts to address the problem of homelessness itself.

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Interventions to Improve the Health of the Homeless: A Systematic Review

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Appendix A. Quality Rating Criteria for Grading Internal Validity of Individual Studies (adapted from the U.S. Preventive Services Task Force)¹

Rating “Good” if study meets all of the following criteria:

- Initial assembly of comparable groups
- Maintenance of comparable groups throughout the study with follow-up at least 80% at the end of the study
- Measurements: equal, reliable, and valid (includes masking of outcome assessment)
- Clear definition of interventions
- All important outcomes considered
- Analysis: adjustment for potential confounders and intention-to-treat analysis
- Blinded outcome assessment.

Rating “Fair” if any or all of the following problems occur, without the fatal flaws noted in the “Poor” category:

- Generally comparable groups assembled initially but there is some question of whether some (although not major) differences occurred with follow-up
- Measurement instruments acceptable (although not ideal)
- Some but not all important outcomes considered
- Some but not all potential confounders accounted for
- Not an intention-to-treat analysis

Rating “Poor” if any of the following fatal flaws exist:

- Groups assembled initially not even close to being comparable or not maintained throughout the study
- Unreliable or invalid measurement instruments used or not applied at all equally among groups
- Inattention to key confounders
- Follow-up less than 50% at the end of the study
- Sample size <50 per group

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Appendix B. Summary Evidence Table: Interventions for Homeless People with Mental Illness

Study reference and design	Quality rating and key reasons ^a for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
CASE MANAGEMENT / HOUSING							
Dickey (1996) ²	Good	Homeless adults with major mental illness living in shelters	All participants received case management and housing	Neuro-psychological functioning:	=	Inpatient mental health services	= Housing stability index
Goldfinger (1999) ³		Enrolled: N=118	Intervention 1: Placement in an group housing with staff support and gradually increasing self-governance	10 of 11 measures	=	Outpatient mental health services	= Housing status (housed vs not housed) at 18 months
Seidman (2003) ⁴		Analyzed: n=112	Intervention 2: Placement in an independent apartment	1 of 11 measures (executive functioning)	II		II
RCT		Intervention 2: n=51	Follow-up: 86% at 18 months (80% for neuropsychological testing)				Days of homelessness over 18 months
Sherm (2000) ⁵	Fair	Street-dwelling persons with severe mental illness	Intervention: Intensive case management program with outreach, exclusive access to drop-in service center, respite housing, and rehabilitation services	Psychiatric symptoms (CSI) (anxiety, depression, and thought disturbances)	I	Health and social services: Day programs	Proportion of time spent on street, in shelters, and in community living
RCT	Possible differences in follow-up between groups; only 44% of subjects completed all four follow-up interviews	Enrolled: N=168 Intervention: n=91 Control: n=77	Control: Usual care	Self-esteem (RSES)	=	All other services	=
		Male: 76% Mean age: 40 years	Follow-up: 82% had at least 1 follow-up at 6, 12, 18, or 24 months	Quality of life (LQOLS)	I		Proportion of time spent in institutions

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Clark (2003) ⁶ Prospective longitudinal study with nonrandomized allocation	Fair Groups assembled initially were not entirely comparable Follow-up <80% at end of study	Individuals with severe mental illness entering one of two service programs Enrolled: N=152 Intervention 1: n=69 Intervention 2: n=83 Male: 52% Mean age: 38 years Homeless: 91% had history of homelessness	Intervention 1: Case management (outreach, counseling, medication management, housing assistance, linkage to other services) Intervention 2: Case management as above, plus guaranteed access to housing and housing support services Follow-up: 58% at 12 months Intervention 1: 36% Intervention 2: 76%	Number of psychiatric symptoms (CSI)	Days of alcohol use in last 6 months, days of illegal drug use in last 6 months (DAFBC)	=	Proportion of time in stable housing, functionally homeless, and literally homeless In subgroup analysis of subjects with high level of impairment at baseline: 12

Study reference and design	Quality rating and key reasons ^a for rating	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Rosenheck (1995) ⁷	Fair	Homeless veterans with psychiatric disorders (49%) and/or substance use disorders (60%)	Program provided outreach, case management, and residential treatment. Study examined association between outcomes and the following measures of service delivery: initial contact by an outreach worker, number of contacts with program, number of referrals to other services, months of program involvement, days in residential treatment, and increase in public support payments	Psychological distress score (BSI)	Alcohol problems (ASI) and number of days of substance use:		Days housed in last 90 days
Prospective longitudinal study comparing outcomes among individuals receiving different intensities of treatment	Not all potential confounders accounted for	Enrolled: N=564		More contacts with program and more referrals to other services were associated with greater improvement ^b	More contacts with program were associated with greater improvement ^b		Contact by outreach, months of program involvement, and days in residential treatment were associated with greater improvement ^t
	Follow-up <80% at end of study	Male: 98% Mean age: 41 years	Follow-up: 52% at 6 months 72% completed at least one follow-up at 3, 6, 9, or 12 months	Psychiatric and medical problems (ASI)	with greater improvement ^b	=	

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Culhane (2002) ⁸ Longitudinal study of outcomes among individuals receiving supportive housing and matched controls	Good	<p>Intervention group: Homeless persons with severe mental illness who received NY/NY program placement</p> <p>Control group: Homeless persons who did not receive NY/NY program placement, matched to intervention subjects for gender, race, age, indicators of mental illness and substance abuse, and pattern of previous service use.</p> <p>Enrolled in NY/NY program: N=4679 Matched pairs Analyzed: n=3338 for days of shelter use n=570 for inpatient state psychiatric hospital use n=791 for non-Medicaid inpatient hospital days n=457 for Medicaid inpatient hospital days n=457 for Medicaid outpatient visits n=294 for VA inpatient hospital days Male: not stated Mean age: not stated</p>	<p>Intervention: NY/NY program placement, consisting of (1) independent housing linked to community-based or on-site service support, or (2) community residence facilities (including long-term treatment facilities and group homes) providing on-site services, with participation mandated by the residence agreement.</p> <p>Control: No NY/NY program placement</p> <p>Follow-up: 100% at 2 years after placement (service utilization during this period was compared to 2 year period before placement)</p>			<p>State psychiatric hospital inpatient days</p> <p>Public hospital inpatient days (non-Medicaid-reimbursed)</p> <p>Hospital inpatient days (Medicaid-reimbursed)</p> <p>VA hospital inpatient days</p> <p>Outpatient visits and costs (Medicaid-reimbursed)</p> <p>Lower use of outpatient services was defined as a desirable outcome^b</p>	<p>Days of shelter use</p>

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Lipton (1988) ⁹	Poor	Homeless patients with chronic mental illness being discharged from psychiatric inpatient unit	Intervention: Residential treatment program providing permanent supportive housing, case management, meals, activity therapy, referrals to other programs, and on-site psychiatric care	Psychiatric illness severity (structured clinical interview)	=	Percentage of nights spent in hospital over 1 year (including index stay and readmissions)	Percentage of nights in permanent housing over 1 year
RCT	Sample size <50 per group This study met all criteria for good quality except for sample size	Enrolled: N=52 Intervention: n=26 Control: n=26 Male: 65% Mean age: 37 years	Control: Usual care Follow-up: 94% at 12 months				Percentage of nights homeless over 1 year

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Lehman (1997) ¹⁰ RCT	Good	Homeless persons with severe mental illness, admitted to psychiatric inpatient units or referred by community agencies Enrolled: N=152 Intervention: n=77 Control: n=75 Male: 68% Mean age: 38 years	ASSERTIVE COMMUNITY TREATMENT Intervention: Assertive Community Treatment (ACT) (team of psychiatrists, nurses, and social workers with very low client-to-staff ratio providing comprehensive psychiatric care, medication monitoring, intensive case management, and crisis intervention in the community) Control: Usual care 44% of intervention group and 8% of control group received housing vouchers Follow-up: 83% at 12 months Intervention: 87% Control: 77%	Health status (SF-36), psychiatric symptoms (CSI), and quality of life (LQOLS)	=	Psychiatric inpatient days; emergency department visits Mental health and substance abuse outpatient visits General medical inpatient days	Days in stable community housing during follow-up = Days homeless on street Days homeless in shelter Days in jail

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Morse (1997) ¹¹ RCT	Good	Currently or recently homeless persons with serious mental illness in the inpatient units or emergency department of an acute psychiatric hospital Enrolled: N=165 Male: 58% Mean age: 35 years Homeless: 100% currently or in last year	Intervention 1: ACT Intervention 2: ACT plus paraprofessional community worker Intervention 3: Broker case management (case manager with a higher load than an ACT case manager arranges for health care and service delivery from various providers) Follow-up: 82% at 18 months	Psychiatric symptoms (BPRS): Thought disorder and unusual activity level Anxiety-depression, hostility-suspicion, and withdrawal-elevated mood Self-esteem (RSES)	Days of alcohol or substance use in last month Client and interviewer ratings of need for alcohol or drug treatment	=	Mean days in stable housing per month
Morse (1992) ¹² RCT	Fair Follow-up <80% at end of study	Homeless shelter-dwellers with serious psychiatric disorders Enrolled: N=178 Intervention 1: n=52 Intervention 2: n=62 Control: n=64 Male: 58% Mean age: 34 years	Intervention 1: ACT Intervention 2: Drop-in center, with social workers providing referrals to services Control: Usual care at outpatient mental health clinic Follow-up: 57% at 12 months Intervention 1: 71% Intervention 2: 48% Control: 55%	Psychiatric symptoms (BSI) Self-esteem (RSES) Interpersonal adjustment (PSNAS)	Monthly quantity and frequency of alcohol use	Program contact (days per month)	Days of homelessness in past month I1 better than C, and C better than I2 ^b

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Rosenheck (2002) ¹³ RCT	Good	Homeless persons with severe mental illness, not involved in ongoing community treatment Enrolled: N=7055 Male: not stated Mean age: not stated	ACCESS PROGRAM Access to Community Care and Effective Services and Supports (ACCESS) Program: 18 sites across the US each provided ACT services to 400 clients over 4 years Intervention: Technical support and additional funding (\$250,000 per year) provided to 9 sites to promote system integration among organizations providing psychiatric, medical, and substance abuse treatment, and housing, income, and employment support Control: No special effort to promote systems integration at 9 sites Follow-up rate: 82% at 3 months 78% at 12 months 91% completed at least one follow-up	Mental health symptoms (standardized average of psychiatric problems score (ASI), depression symptoms score (DIS), and psychotic symptoms score (PERI)) Quality of life (LQOLS)	Alcohol problems (ASI) and drug problems (ASI)	Psychiatric services in the past 30 days	Achievement of independent housing for past 30 days

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Calsyn (2000) ¹⁴	Fair	Homeless persons with severe mental illness receiving ACT through the ACCESS program	Intervention 1: Participants chose to enter ACT from a selection of 5 different treatment program options Intervention 2: Participants were assigned to the ACT program by an intake worker (year 2 of study)	Depression symptoms (DIS) and psychotic symptoms (PERI)	Days of illegal drug use and/or alcohol intoxication in the past month	=	Days in stable housing in last 60 days
Secondary analysis of RCT data	Secondary analysis of good quality study; intervention examined is not the one randomly allocated in the original RCT	Enrolled: N=128 Intervention 1: n=70 Intervention 2: n=58 Male: not stated Mean age: not stated	Follow-up: 82% provided data at baseline, 3 months, and 12 months				
Chinman 2000a ¹⁵	Fair	Homeless persons with severe mental illness receiving ACT through the ACCESS program	Intervention 1: Service provision by a consumer case manager (a person with a history of treatment for serious mental illness) Intervention 2: Service provision by a nonconsumer case-manager	Depression symptoms (DIS), psychotic symptoms (PERI), general psychiatric problems (ASI), and quality of life (LQOLS)	Alcohol use (ASI) and drug use (ASI)	=	Days of homelessness in last 60 days
Secondary analysis of RCT data	Secondary analysis of good quality study; intervention examined is not the one randomly allocated in the original RCT	Enrolled: N=1203 Analyzed: n=743 Intervention 1: n=113 Intervention 2: n=630 Male: 67% Mean age: 38 years	Follow-up: 62% at 12 months				Percentage obtaining stable housing at 12 months

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Chinman 2000b ¹⁶	Fair	Homeless persons with severe mental illness receiving ACT through the ACCESS program	Study examined effect of client-case manager racial pairing on outcomes. All clients were white or African American and all case-managers were white or African American	Depression symptoms (DIS), psychotic symptoms (PERI), general psychiatric problems (ASI), and quality of life (LQOLS)	Alcohol use (ASI) and drug use (ASI)	Emergency services, medical-surgical services, substance abuse services, outpatient psychological services	Days of homelessness in last 60 days
Secondary analysis of RCT data	Secondary analysis of good quality study; intervention examined is not the one randomly allocated in the original RCT	Enrolled: N=2398 Analyzed: n=1791 Male: 64% Mean age: 38 years	Follow-up: 75% at 12 months				
Ortega (2002) ¹⁷	Fair	Homeless persons with severe mental illness receiving ACT through the ACCESS program	Study examined effect of client-case manager ethnic/racial pairing on outcomes. All clients were white or Hispanic, and all case managers were white, Hispanic, or African American	Depression symptoms (DIS), general psychiatric problems (ASI), and quality of life (LQOLS)	Alcohol use (ASI) and drug use (ASI)	Emergency services, medical-surgical services, substance abuse services, outpatient psychological services	Days of homelessness in last 60 days
Secondary analysis of RCT data	Secondary analysis of good quality study; intervention examined is not the one randomly allocated in the original RCT	Enrolled: N=2575 Analyzed: n=2123 Male: 61% Mean age: 39 years	Follow-up: 75% at 12 months	Psychotic symptoms (PERI) Except Hispanic clients with Hispanic case managers had less improvement ^b			

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Rosenheck (2001) ¹⁸	Fair	Homeless persons with severe mental illness receiving ACT through the ACCESS program	Study examined outcomes among persons who continued to in the ACT program (C) and those who were discharged from ACT based on the clinical judgment of treating team (I), at various times over an 18 month period	Mental health symptoms (see 202 above for details)	Alcohol problems (ASI); Drug problems (ASI)	Outpatient mental health services in the past 30 days	Any homelessness in last 30 days
Secondary analysis of RCT data	Secondary analysis of good quality study; intervention examined is not the one randomly allocated in the original RCT	Enrolled: N=1617 Male: 61% Mean age: 39 years	Follow-up: 72% at 18 months	Quality of life (LQOLS)		Inpatient psychiatric hospital days in the past 30 days	
OTHER INTERVENTIONS							
Rosenheck (2000) ¹⁹	Fair	Homeless mentally ill veterans applying for Social Security benefits through an outreach program	Intervention: Receipt of Social Security benefits (average \$612 per month) Control: Denial of Social Security benefits	Psychiatric problems (ASI) and medical problems (ASI)	Alcohol problems (ASI); drug problems (ASI)		Days of homelessness in last 3 months
Prospective longitudinal study with nonrandomized allocation	Follow-up <80% at end of study	Enrolled: N=280 Analyzed: n=173 Intervention: n=50 Control: n=123 Male: 91% Mean age: 47 years	Follow-up: 62% at 3 months	Quality of life (LQOLS)			

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Buhrich (1996) ²⁰	Poor	Homeless persons with schizophrenia living in shelters who were referred to a psychiatric outreach clinic	Intervention: Individuals referred to and receiving treatment from a psychiatric team conducting outreach clinics at shelters and offering crisis intervention service and case management			Annual hospitalizations on rate and mean number of hospital days per year:	
Retrospective study comparing outcomes among groups receiving different treatments	Groups assembled initially not comparable	Enrolled: N=506 Intervention: n=415 Control: n=91	Control: Individuals who were referred to the outreach clinic but who did not attend			In the 4 years before referral =	
	Potential confounders not accounted for	Male: 88% Mean age: 40 years	Follow-up: Review of hospital records for 4 years before and after referral date			In the 4 years after referral I	
Susser (1998) ²¹	Poor	Homeless men with severe mental illness residing at a shelter	Intervention: "Sex, Games, & Videotape" interactive small-group sessions to teach safer sexual practices (15 sessions over 8 weeks)			Sexual risk index (Vaginal Episode Equivalent):	
RCT	Sample size <50 per group	Enrolled: N=97 Analyzed: n=59 Intervention: n=33 Control: n=26	Control: 2 educational sessions on HIV, STDs, and condom use			at 6 months I	
	This study met all criteria for good quality except for sample size	Male: 100% Age: 58% ≥5 years	Follow-up rate: 95% at 18 months			at 18 months =	

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Herman (2000) ²²	Poor	Homeless persons with severe mental illness who were discharged from a shelter-based psychiatric program to community housing	Intervention: Critical time intervention, a case management program providing support and enhancing continuity of care during a 9-month transition period Control: Usual services	Negative symptoms of schizophrenia (positive and negative syndrome scale)	I	Outpatient mental health care costs	Number of nonhomeless nights during follow-up
Susser (1997) ²³	Sample size <50 per group	Enrolled: N=96	Follow-up: 79% at 6 months (for psychiatric symptoms) 95% at 18 months (for health care costs)	Positive symptoms of schizophrenia and general psycho-pathology symptoms (positive and negative syndrome scale)	=	Inpatient and emergency service costs	
Jones (2003) ²⁴	Follow-up <80% at end of study	Psychiatric symptoms: Analyzed: n=76 Intervention: n=38 Control: n=38				Substance abuse services	
RCT		Health care costs: Analyzed: n=91 Intervention: n=47 Control: n=44				Total health and social service costs	
		Male: 100% Median age: 36 years					

Notes: Group(s) with a significantly better outcome are identified as follows: C, Control; I, Intervention; II, Intervention 1; I2, Intervention 2. An equals sign (=) indicates no significant difference between groups. For service utilization, better outcomes were defined as lower utilization of inpatient and emergency department services and higher utilization of outpatient services and substance abuse treatment programs, unless otherwise specified. For housing status, better outcomes were defined as less time spent living on the street, less time spent homeless, more time spent in stable housing, or higher housing stability.

^a Key reasons for quality rating are listed only if the study received a quality rating of fair or poor.

^b Indicates details are provided in a note within that entry in the table.

ASI, Addiction Severity Index
BPRS, Brief Psychiatric Rating Scale
BSI, Brief Symptom Inventory
CES-D, Center for Epidemiologic Studies-Depression Scale
CSEI, Coopersmith Self-Esteem Inventory
CSI, Colorado Symptom Index
DAFBC, Drug and Alcohol Follow-Back Calendar
DIS, Diagnostic Interview Schedule
HSI, Housing Stability Index
LDS, Life Domains Scale
LQOLS, Lehman Quality of Life Scale
MHI-5, Mental Health Index-5
NHP, Nottingham Health Profile

PBS, Problem Behaviors Scale
PERI, Psychiatric Epidemiology Research Interview
PESQ, Personal Experience Screening Questionnaire
PSNAS, Personality and Social Network Adjustment Scale
RADS, Reynolds Adolescent Depression Scale
RCT, randomized controlled trial
RSES, Rosenberg Self-Esteem Scale
SCL-90(R), Symptom Checklist-90 (Revised)
SMAS, Shortened Manifest Anxiety Scale
TSI, Treatment Services Inventory
VA, Veterans Affairs
YSR, Youth Self-Report Inventory

Appendix C. Summary Evidence Table: Interventions for Homeless People with Substance Abuse

Study reference and design	Quality rating and key reasons ^a for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Braucht (1995) ²⁵ RCT	Good	Homeless substance abusers participating in residential or outpatient treatment Enrolled: N=323 Intervention: n=163 Control: n=160 Males: 85% Mean age: 35 years	CASE MANAGEMENT / HOUSING Intervention: Intensive case management (comprehensive service plan; linkage between services providers and clients; average client-to-case-manager ratio of 15:2) Control: No case management Follow-up: 88% at 10 months Intervention: 88% Control: 87%	Medical problems (ASI) Psychological problems (ASI) Quality of life (LQOLS)	Alcohol problems (ASI); days of alcohol use in the last 30 days Drug problems (ASI); days of drug use in last 30 days	Contacts with on-site addiction counselors or off-site service providers =	Days not literally homeless in last 60 days Quality of housing in last 60 days =

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Cox (1998) ²⁶	Fair	High-frequency users of detoxification services who were homeless or at risk of homelessness	Intervention: Intensive case management (long-term, open-ended, outreach-oriented service focused on system advocacy and linkage; not contingent on client behavior; average 15 clients per case manager) Control: Usual care		Alcohol problems score (ASI) Days of alcohol use in the last 30 days	I I	Nights in "own place" in last 60 days
RCT	Follow-up <80% at end of study	Enrolled: N=298 Intervention: n=150 Control: n=148 Male: 81% Mean age: 43 years Mean nights homeless in last 60 days: 25 (standard deviation±21)	Follow-up: 76% at 18 months				
Sosin (1995) ²⁷	Fair	Homeless persons with alcohol/drug problems completing 28-day post-detoxification program	Intervention 1: Case management, with assistance finding housing in the community Intervention 2: Case management, with provision of supported housing in independent apartments Control: Usual care (referrals to substance abuse agencies and welfare offices)		Days of alcohol use in the last 30 days Days of drug use in last 30 days	I1 and I2 I1 and I2	Days domiciled in last 60 days I1 better than I2, and I2 better than C ^b
Prospective longitudinal study with nonrandomized allocation	Follow-up <80% at end of study	Enrolled: N=419 Intervention 1: n=96 Intervention 2: n=136 Control: n=187 Male: 75% Mean age: 35 years	Follow-up: 74% at 12 months				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Lapham (1995) ²⁸	Fair	Homeless single adult alcohol abusers	Intervention 1: Case management and substance abuse counseling; 4 months of abstinence-contingent housing in a shared apartment		Alcohol problems (ASI); days of alcohol use in the last 30 days		Days of stable housing in last 30 days
RCT	Follow-up <80% at end of study	Enrolled: N=469 Intervention 1: n=161 Intervention 2: n=164 Intervention 3a: n=92 Intervention 3b: n=52 Male: 87% Median age: 37 years	Intervention 2: Substance abuse treatment in the community; 4 months of abstinence-contingent housing as above Intervention 3a (discontinued halfway through study due to safety concerns): No specific substance abuse treatment; 4 months of abstinence-contingent housing as above Intervention 3b (established halfway through study): Referral to alcohol treatment agencies; no housing provided		Drug problems (ASI); days of drug use in last 30 days		
			Follow-up: 78% at 10 months (75% to 84% within each group)				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Stahler (1995) ²⁹ RCT	Fair Follow-up <80% at end of study	Men with substance abuse and no mental illness entering a men's shelter Enrolled: N=722 Intervention 1: n=220 Intervention 2: n=200 Control: n=302 Male: 100% Mean age: 33 years	Intervention 1: Residential treatment program (individual and group therapy, vocational and life skills training) Intervention 2: Intensive case management services at shelter by peer counselors (average of 15 clients per case manager) Controls: Usual care, with standard case management at shelter (average of 50–75 clients per case manager) Follow-up: 76% at 6 months	Psychological problems (ASI)	Days of alcohol use in the last 30 days; money spent per month on alcohol; proportion abstinent from alcohol for last 30 days Days of cocaine use in the last 30 days; money spent per month on drugs; proportion abstinent from cocaine for last 30 days	= =	Days of stable housing in last 30 days Days of literal homelessness in last 30 days

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Rosenheck (2003) ³⁰	Fair	Homeless veterans with substance abuse (50%), mental illness (15%), or both (35%), who were receiving services through a VA program	Intervention 1: Intensive case management, with voucher providing immediate access to subsidized housing Intervention 2: Intensive case management alone Control: Short-term broker case management through outreach worker	Psychiatric problems (ASI); psychological distress score (BSI) Medical problems (ASI)	Alcohol problems (ASI); days drinking to intoxication in past 30 days Drug problems (ASI)	Outpatient VA mental health visits	Days housed in last 90 days Days homeless in past 90 days
RCT	Follow-up <80% at end of study	Enrolled: N=460 Intervention 1: n=182 Intervention 2: n=90 Control: n=188 Male: 96% Mean age: 42 years	Follow-up: 53% at 36 months Intervention 1=70% Intervention 2=48% Controls=40%	Quality of life (LQOLS)			

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Orwin (1994a) ³¹ and Orwin (1994b) ³²	Poor	Homeless persons with substance abuse in 5 cities	Each city implemented different interventions involving delivery of case management services Boston:	Psychiatric problems (ASD):	Days of alcohol use in the last 30 days;	Housing status:	Boston
Prospective longitudinal study with nonrandomized allocation	Inadequate specification of study design and methods Potential confounders not accounted for Sample size <50 per group (in some cities) Follow-up <50% at end of study (in some cities)	Male: not stated Mean age: not stated Boston, MA: Enrolled: N=491 Intervention: n=256 Control: n=235 Louisville, KY Enrolled: N=179 Intervention: n=142 Control: n=37 Minneapolis, MN Enrolled: N=199 Intervention: n=82 Control: n=117 Los Angeles, CA Enrolled: N=262 Intervention: n=176 Control: n=86 New York, NY Enrolled: N=531 Intervention: n=227 Control: n=304	Intervention: Case management Control: Usual care Follow-up: Intervention=71% Control=54% Louisville: Intervention: Intensive case management and treatment services Control: Treatment services Follow-up: Intervention=68% Control=51% Minneapolis: Intervention: Intensive case management Control: Intermediate-intensity case management Follow-up: Intervention=41% Control=62% Los Angeles: Intervention: 90-day treatment program followed by 120-day recovery program Control: 90-day treatment program only Follow-up: Intervention=51% Control=49% New York: Intervention: Women referred to program by outreach workers Control: Women referred to program from other sources Follow-up: Intervention=57% Control=24%	Los Angeles Boston, Minneapolis, Louisville, New York Medical problems (ASD): All sites	Boston, New York Minneapolis, Louisville, Los Angeles	New York, Minneapolis, Louisville, Los Angeles	Boston New York, Minneapolis, Louisville, Los Angeles

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
POST-DETOXIFICATION STABILIZATION PROGRAMS							
Kertesz (2003) ³³	Fair	Homeless people completing short-term detoxification for substance abuse	Intervention: Admission to a stabilization program (2–6 week program providing temporary treatment support and residence after detoxification)		Time to recurrent substance use		
Secondary analysis of RCT data	Secondary analysis of RCT; intervention examined is not the one randomly allocated in the original RCT	Enrolled: N=219 Analyzed: n=123 Intervention: n=53 Control: n=70 Male: 81% Mean age: 37 years	Control: No admission to a stabilization program Follow-up rate: 54% at 6 months				
Argeriou (1993) ³⁴	Poor	Homeless adults completing short-term detoxification for substance abuse	Intervention 1 and 2: Admission to stabilization programs at two homeless shelters Intervention 3 and 4: Admission to stabilization programs at two substance abuse treatment agencies (not located at shelters)	Psychiatric problems (ASI)	Alcohol problems (ASI)		
RCT	Follow-up <80% at end of study <50% at end of study	Enrolled: N=773 Intervention 1: n=180 Intervention 2: n=216 Intervention 3: n=185 Intervention 4: n=192 Male: 89% Mean age: 34 years	Follow-up at 9 months: Intervention 1=43% Intervention 2=44% Intervention 3=32% Intervention 4=41%	Medical problems (ASI)	Drug problems (ASI)		

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Milby (1996) ³⁵ RCT	Fair Follow-up <80% at end of study	Homeless substance users (72% using crack cocaine) Enrolled: N=176 Intervention: n=89 Control: n=87 Males: 79% Mean age: 36 years	ABSTINENCE-CONTINGENT WORK THERAPY Intervention: Intensive day treatment with group and individual counseling and education for 2 months, followed by day treatment two half-days per week and abstinence-contingent work therapy (construction work at minimum wage) for 4 months Control: Usual care with twice-weekly 12-step-oriented group, individual counseling, and referrals for housing, vocational, and medical services Participants with at least one follow-up at 2, 6, or 12 months: 74% Intervention: 78% Control: 71%		Days of alcohol use in last 30 days (ASI) Urine toxicology tests positive for cocaine use		Days homeless in last 60 days

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Kashner (2002) ³⁶	Poor	Homeless veterans with substance abuse in a comprehensive VA program providing medical, mental health, addiction, and vocational rehabilitation services	Intervention: Abstinence-contingent performance-based therapeutic work program in a staff-supervised, structured setting Control: Usual care	Psychiatric problems (ASI); psychiatric status (BSI)	Alcohol consumption (ASI) Drug consumption (ASI)	Outpatient addiction services in the last 3 months	Nights homeless in last 3 months
RCT	This study met all criteria for good quality except for sample size	Enrolled: N=162 Intervention: n=127 Control: n=35	Follow-up at 12 months: 88% Intervention=87% Control=89%	Mental Functioning; social Functioning (SF-36) Physical Functioning (SF-36)			
		Male: not stated Mean age: 43-44 years		Medical problems (ASI)			

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
THERAPEUTIC COMMUNITY							
Lam (1995) ³⁷	Fair	Homeless cocaine-abusing men who had completed detoxification	Intervention: 3-month residential treatment program (modified therapeutic community with group and individual therapy, phased responsibilities, relapse prevention training), followed by 6 months of case management		Alcohol problems score (ASI); alcohol use in the last 30 days	=	Any literal or marginal homeless within last 60 days:
RCT	Follow-up <80% at 15 months	Enrolled: N=294 Intervention: n=182 Control: n=112	Control: Usual care		Drug composite score (ASI); cocaine use in the last 30 days	=	At 9 months
	Follow-up <50% at end of study (21 months) This study duration is longer than typical, so study was not given a poor quality rating	Male: 100% Mean age: 33 years	Follow-up: 81% at 9 months, 51% at 15 months, 23% at 21 months		Use of more than one substance in the last 30 days:		At 15 and 21 months
							Any institutional housing within last 60 days:
					At 9 months	I	At 9, 15, and 21 months
					At 15 and 21 months	=	Any traditional housing within last 60 days:
							At 9, 15, and 21 months

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Burling (1992) ³⁸	Poor	Homeless veterans with substance abuse in a 6–8 month therapeutic-	Intervention: Program patients who voluntarily participated in a softball team that played in a men's league	Program patients who	Abstinence from drugs and alcohol in the last 30 days	Length of stay in residential treatment program	Proportion housed throughout 3 months after discharge
Prospective longitudinal study with nonrandomized allocation	Groups assembled initially not comparable	community residential rehabilitation program	Control 1: Program patients who chose not to participate on the softball team, but who stayed in treatment for at least 30 days	Control 1: Program patients who chose not to participate on the softball team, but who stayed in treatment for at least 30 days	I was compared to C2 only ^b		
	Potential confounders not accounted for	Enrolled: N=218 Intervention: n=34 Control 1: n=102 Control 2: n=82	Control 2: Program patients one year prior to the initiation of softball team, who stayed in treatment for at least 30 days				
		In Intervention group: Male: 97% Mean age: 39 years	Follow-up at 3 months after discharge from program: Intervention=68% Control 1= not applicable Control 2=74%				

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Liberty (1998) ³⁹	Poor	Homeless men with substance abuse	Intervention 1: Modified therapeutic community located at a homeless shelter, directed by unpaid peer counselors	Psychological status (BDI)	Self-reported use in the last 30 days or		Proportion homeless at follow-up
Prospective longitudinal study with nonrandomized allocation	Follow-up <50% at end of study	Enrolled: N=605 Intervention 1: n=299 Intervention 2: n=79 Intervention 3: n=152 Control: n=75	Intervention 2: Intervention 1, after the introduction of formal training for peer counselors on the principals of therapeutic community Intervention 3: Traditional therapeutic community located at a homeless shelter, staffed by paid peer counselors, with additional individual counseling and case management	Beck Hopelessness Scale	positive urine test for the following: alcohol, cocaine, heroin, any substance		
		Male: 100% Mean age: 34 years	Control: Dormitory located at a homeless shelter, with mandatory abstinence, daily addiction treatment in the community, and in-house 12-step meetings				
			Follow-up: 35% at 6 months Intervention 1=41% Intervention 2=28% Intervention 3=26% Control=36%				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
OTHER RESIDENTIAL TREATMENT PROGRAMS							
Devine (1997) ⁴⁰	Fair	Homeless substance abusers completing detoxification	Residential program participants were assigned to intervention 1 or 2:	Psychiatric problems (ASI)	Alcohol problems (ASI)	I1 and I2	I1 and I2
Devine (1995) ⁴¹	Groups assembled initially were not entirely comparable	Enrolled: N=670 Intervention 1: n=107	Intervention 1: 21-day residential program with case management, group meetings, and outpatient treatment	Medical problems (ASI)	Drug problems (ASI)	=	Days housed in last 30 days
Prospective longitudinal study with nonrandomized allocation	Not all potential confounders accounted for	Intervention 2: n=57 Control: n=506 Male: 75% Mean age: 34 years	Intervention 2: Intervention 1, with continued services for 12 months Controls: Nonparticipants in the residential program Follow-up: 93% completed an interview at 3 or 6 months		Days abstinent from both alcohol and drugs in the last 30 days	I1 and I2	

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Conrad (1998) ⁴²	Fair	Homeless veterans with substance dependence completing detoxification	Intervention: 3–6 month cognitive-behavioral residential program with case management (10 clients per case manager), relapse prevention training, 12-step meetings, vocational rehabilitation, and referral to community services	Psychiatric problems (ASI)	Alcohol problems (ASI)		Proportion with no nights homeless in last 60 nights: I
RCT	Follow-up <80% at end of study	Enrolled: N=358 Intervention: n=178 Control: n=180 Male: 100% Mean age: about 40 years	Control: 21-day inpatient substance abuse treatment unit with individual and group therapy, substance abuse education, medical and psychiatric assessment, and referral to community services	Medical problems (ASI); At 6 months I At 3, 9, 12, 18 and 24 months =	At 3 and 9 months I At 6, 12, 18, and 24 months = Drug problems (ASI)		At 3 and 12 months = At 6, 9, and 18 months C At 24 months
			Follow-up: Mean 59% over 24 months Intervention: 60% to 77% Control: 47% to 57%		At 3, 6, and 9 months I At 12, 18, and 24 months =		

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Miescher (1996) ⁴³	Poor	Homeless persons with alcohol dependence entering an outpatient treatment program with daily meetings, case management, counseling, and psychotherapy	Intervention 1: Residence in abstinence-mandatory unit at shelter affiliated with treatment program Intervention 2: Housed independently Intervention 3: Residence in regular shelter		Proportion using alcohol or drugs or "exhibiting behavioral problems"	Proportion remaining active in treatment program	11 and 12
Retrospective study comparing outcomes among groups receiving different treatments	Sample size <50 per group Measurement instruments not reliable/valid	Enrolled: N=189 Intervention 1: n=100 Intervention 2: n=55 Intervention 3: n=34	Follow-up: 100% ascertainment of proportion remaining active in treatment program at 12 months				
Smith (1998) ⁴⁴	Poor	Chronically homeless persons with alcohol dependence and without any primary drug problem	Intervention: Behaviorally oriented skills-training group sessions on problem-solving, communication, and drink refusal, daily for up to 3 months. Disulfiram prescribed to 21 individuals. Abstinence-contingent housing for 3 months Control: Usual care with 12-step program and individual counseling. Abstinence-contingent housing for 3 months		Number of drinks per week; number of drinking days per week; peak blood alcohol content		Proportion homeless: At 4 months At 2, 6, 9, and 12 months
RCT	Sample size <50 per group Follow-up <80% at end of study	Enrolled: N=106 Intervention: n=64 Control: n=42 Male: 86% Mean age: 38 years					

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
PREVENTIVE HEALTH INTERVENTIONS							
Wright (2002) ⁴⁵	Good	Homeless patients at a primary care center with a current or past history of any illicit drug use	Intervention: Hepatitis B immunization on accelerated schedule with shots at 0, 7, and 21 days Control: Hepatitis B immunization on conventional schedule with shots at 0, 1, and 6 months			Completion rate of full series of 3 Hepatitis B immunizations	I
Retrospective study comparing outcomes among groups receiving different treatments		Enrolled: N=144 Intervention: n=90 Control: n=54 Male: 85% Mean age: 27 years					

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Burling (2001) ⁴⁶ RCT	Good	Cigarette-smoking homeless veterans in a long-term residential treatment program for substance dependence Enrolled: N=200 Intervention 1: n=50 Intervention 2: n=50 Control 1: n=50 Control 2: n=50 Male: 95% Mean age: 41 years	Intervention 1: Smoking cessation counseling for 9 weeks; pre-quit smoking taper for 5 weeks, then post-quit nicotine patches for 4 weeks Intervention 2: Same as Intervention 1, plus training on application of smoking cessation strategies to cessation of alcohol and drug use Control 1: Individuals who were willing to participate in smoking cessation program but were assigned to usual care Control group 2: Individuals who were not willing to participate in smoking cessation program		Abstinence from smoking for the last 7 days (verified by breath and urine testing): I1 At 2 months and I2 =		
			Follow-up at 13 months: Intervention 1=94% Intervention 2=90% Control 1=92% Control 2=94%		At all subsequent time points Abstinence from alcohol and drugs for the last 30 days (verified by breath and urine testing) Except I1 better than I2 ^b		

Notes: Group(s) with a significantly better outcome are identified as follows: C, Control; I, Intervention; I1, Intervention 1; I2, Intervention 2. An equals sign (=) indicates no significant difference between groups. For service utilization, better outcomes were defined as lower utilization of inpatient and emergency department services and higher utilization of outpatient services and substance abuse treatment programs, unless otherwise specified. For housing status, better outcomes were defined as less time spent living on the street, less time spent homeless, more time spent in stable housing, or higher housing stability.

^a Key reasons for quality rating are listed only if the study received a quality rating of fair or poor.

^b Indicates details are provided in a note within that entry in the table.

ASI, Addiction Severity Index	PBS, Problem Behaviors Scale
BPRS, Brief Psychiatric Rating Scale	PERI, Psychiatric Epidemiology Research Interview
BSI, Brief Symptom Inventory	PESQ, Personal Experience Screening Questionnaire
CES-D, Center for Epidemiologic Studies-Depression Scale	PSNAS, Personality and Social Network Adjustment Scale
CSEI, Coopersmith Self-Esteem Inventory	RADS, Reynolds Adolescent Depression Scale
CSI, Colorado Symptom Index	RCT, randomized controlled trial
DAFBC, Drug and Alcohol Follow-Back Calendar	RSES, Rosenberg Self-Esteem Scale
DIS, Diagnostic Interview Schedule	SCL-90(R), Symptom Checklist-90 (Revised)
HSI, Housing Stability Index	SMAS, Shortened Manifest Anxiety Scale
LDS, Life Domains Scale	TSI, Treatment Services Inventory
LQOLS, Lehman Quality of Life Scale	VA, Veterans Affairs
MHI-5, Mental Health Index-5	YSR, Youth Self-Report Inventory
NHP, Nottingham Health Profile	

Appendix D. Summary Evidence Table: Interventions for Homeless People with Concurrent Mental Illness and Substance Abuse

Study reference and design	Quality rating and key reasons ^a for rating	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Drake (1997) ⁴⁷	Good	Homeless persons with severe mental illness and substance abuse/dependence	INTEGRATED TREATMENT Intervention 1: Integrated mental health treatment, substance abuse counseling, case management, and housing services through a single agency	Psychiatric symptoms (BPRS)	Alcohol Use Scale: In all subjects		Days homeless in last 60 days
Prospective longitudinal study with nonrandomized allocation		Enrolled: N=217 Intervention 1: n=158 Intervention 2: n=59 Male: 34% Mean age: 35 years	Intervention 2: Similar services as Intervention 1, but provided through multiple agencies Follow-up: 86% at 12 or 18 months Intervention 1=89% Intervention 2=80%	Quality of life (LQOLS)	In subjects with alcohol disorder Drug Use Scale: In all subjects In subjects with drug disorder		Days in stable housing in last 60 days

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Burnam (1995) ⁴⁸	Fair	Homeless persons with serious mental illness and substance dependence	Intervention 1: Residential program providing integrated mental health and substance abuse treatment. Abstinence required to remain in program	Depression/anxiety, psychotic symptoms, anger/hostility (SCL-90)	Days of alcohol use in past 30 days:		Proportion of time homeless in last 60 days
RCT	Follow-up <80% at end of study	Enrolled: N=276 Intervention 1: n=144 Intervention 2: n=67 Control: n=65 Male: 84% Mean age: 37 years	Intervention 2: Nonresidential program similar to intervention 1, but with more case management services. Participation not permitted on days of alcohol/drug intoxication, but abstinence not required to remain in program	Mania (PERI)	At 3 months	I	Proportion of time in independent housing in last 60 days
			I1 and I2 did not differ significantly on any outcome and were therefore combined into a single intervention group (I) and compared to the control group	Self-esteem (PERI)	At 3, 6, and 9 months	=	
			Control: Usual care		Level of alcohol use in past 30 days:		
			Follow-up: 70% at 9 months		Days of drug use in past 30 days:		
					At 3, 6, and 9 months	=	
					Severity of drug use:		
					At 3, 6, and 9 months	=	

Study reference and design	Quality rating and key reasons ^a for rating	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Kaspro (1999) ⁴⁹	Poor	Homeless veterans with mental illness and substance abuse	Intervention 1: Residential treatment programs addressing both psychiatric and substance use disorders (43 programs)	Rating of clinical improvement in psychiatric problems	Ratings of clinical improvement in alcohol problems and drug problems	=	Housed at time of discharge from program
Retrospective study comparing outcomes among groups receiving different treatments	Measurement instruments not reliable/valid Potential confounders not accounted for	Enrolled: N=1495 Intervention 1: n=957 Intervention 2: n=538 Male: not stated Mean age: not stated	Intervention 2: Residential treatment programs addressing substance use only (56 programs) Follow-up: Varied by program				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
THERAPEUTIC COMMUNITY							
French (1999) ⁵⁰	Fair	Persons with a history of homelessness, an Axis I psychiatric diagnosis, and substance abuse/dependence	Intervention 1: Modified therapeutic community (residential mutual self-help program with on-site educational, clinical, and vocational services). Promotion to supported housing and independent living	Depression (BDI)	Substance use (frequency of alcohol intoxication, frequency of drug use, number of different drugs used)	HIV-risk behaviors (frequency of injection drug use, number of sexual partners in past 6 months)	=
De Leon (2000) ⁵¹	Follow-up <80% at end of study	Enrolled: N=342 Intervention 1: n=183 Intervention 2: n=93 Control: n=66	Intervention 2: Similar to intervention 1, but more freedom to leave facility, some services offered off-site, reduced client duties, increased direct staff assistance	Anxiety (SMAS)	=	=	=
Prospective longitudinal study with nonrandomized allocation		Male: 75% Mean age: 35 years		Psychiatric symptoms (SCL-90R)			
		Control: Usual care					
		I1 and I2 were analyzed as single intervention (I) compared to controls					
		Follow-up: 67% at 12 months Intervention 1=65% Intervention 2=70% Control=73%					

Study reference and design	Quality rating and key reasons ^a for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Blankertz (1994) ⁵²	Fair	Homeless persons with severe mental illness and substance abuse	Intervention 1: Residential program using psychosocial rehabilitation approach and intensive case management		Abstinence from substance use	Successful exit (defined as abstaining from substances, housed, and no mental health hospitalizations at 3 months after program exit)	II
Prospective longitudinal study with nonrandomized allocation	Follow-up <80% at end of study	Enrolled: N=176 Intervention 1: n=85 Intervention 2: n=121	Intervention 2: Residential program using a modified therapeutic community approach and traditional case management				II
	Not an intention-to-treat analysis (only subjects who completed >60 days of treatment)	Analyzed (those who completed >60 days of treatment): N=89	Follow-up: 51% at 3 months Intervention 1=60% Intervention 2=31%				
	>60 days of treatment were analyzed; sample size <50 in one analyzed group; study could be rated poor quality based on this feature	Intervention 1: n=51 Intervention 2: n=38 Male: 63% Mean age: 33 years					

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Nuttbrock (1998) ³³	Poor	Homeless men with substance abuse, major mental disorder, and ≥ psychiatric hospitalizations	Intervention 1: Therapeutic community with all treatment provided on-site, peer support, clearly defined rules and privileges, and mandatory abstinence	Depression (CES-D)	Number of positive urine drug tests		II
RCT	Follow-up <50% at end of study	Enrolled: N=694 Intervention 1: n=373 Intervention 2: n=321	Intervention 2: Community residence with treatment provided off-site at day programs, less highly structured than therapeutic community, abstinence expected but relapses tolerated	Anxiety (BPRS)	Use of alcohol, marijuana, heroin, cocaine, and crack (ASI)		II
		Analyzed (those who entered treatment): N=290 Intervention 1: n=169 Intervention 2: n=121	Follow-up among those who entered treatment: Intervention 1=25% at 12 months Intervention 2=37% at 12 months	Psychiatric symptoms (BPRS)			
		Male: 100% Mean age: 31 years		Agoraphobia			
				Psychotic ideation			
				Global Assessment of Functioning Scale			II

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Sacks (2003) ⁵⁴	Poor	Persons with a history of homelessness, an Axis I psychiatric diagnosis, and substance abuse/dependence who completed a therapeutic community treatment program (57)	Intervention: Individuals who elected to enter a therapeutic community-oriented supported housing program Control: Individuals who declined to enter the supportive housing program	Depression (BDI)	Substance use (frequency of alcohol intoxication, frequency of drug use, number of different drugs used)	HIV-risk behaviors (frequency of injection drug use, number of sexual partners in past 6 months)	=
Prospective longitudinal study with nonrandomized allocation	Sample size <50 per group Follow-up <80% at end of study	Enrolled: N=115 Intervention: n=81 Control: n=34 Male: 69% Mean age: 36 years	Follow-up: 76% at 24 months Intervention=89% Control=44%	Anxiety (SMAS) Psychiatric symptoms (SCL-90R)	=	=	=

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
OTHER INTERVENTIONS							
Milby (2000) ⁵⁵	Fair	Homeless persons with cocaine abuse/dependence and nonpsychotic mental disorder	Intervention 1: Behavioral day treatment (daily group and individual therapy and educational sessions) plus abstinence-contingent housing and work therapy		Percentage of days abstinent from drugs in the last 60 days, based on urine testing: at 2 and 6 months	II	Days homeless in last 60 days:
Milby (2003) ⁵⁶	Follow-up <80% at end of study	Enrolled: N=141 Intervention 1: n=72 Intervention 2: n=69	Intervention 2: Behavioral day treatment only		At 2 months	=	At 2 months
RCT		Males: 72% Mean age: 38 years	Follow-up: 71% at 12 months Intervention 1=79% Intervention 2=62%		At 6 months	II	At 6 months
					Abstinence from drugs in the last 30 days, based on urine testing and self-report (ASI): at 12 months	=	At 12 months

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Tsemberis (2004) ⁵⁷	Fair	Chronically homeless persons with severe Axis I mental illness	Intervention 1: "Housing First" program provided immediate housing in an independent apartment without any prerequisite psychiatric treatment or sobriety. Clients were offered ACT and housing support services, but could refuse	Psychiatric symptoms (CSI)	=	Substance abuse treatment utilization (modified TSI)	Proportion of time homeless in last 6 months: at 6, 12, 18, and 24 months
Gulcur (2003) ⁵⁸	Follow-up <80% at end of study	alcohol or substance abuse disorder, but this was not an eligibility requirement)	Intervention 2: "Continuum of Care" program provided outreach services, followed by treatment and transitional housing, then permanent supportive housing. Receipt of housing was contingent on sobriety and compliance with psychiatric treatment		=	Proportion of time spent hospitalized	Proportion of time stably housed in last 6 months: at 6, 12, 18, and 24 months
RCT		Enrolled: N=206 Intervention 1: n=87 Intervention 2: n=119 Male: 79% Mean age: 41 years					
			Follow-up: 78% at 24 months				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Rosenheck (1997) ⁵⁹	Fair	Homeless persons with severe mental illness and alcohol or drug abuse/dependence who were receiving ACT through the ACCESS program (34)	Intervention: Payee to manage disbursement of public support benefits on behalf of recipient Control: No payee to manage disbursement of public support benefits on behalf of recipient Follow-up: 83% at 3 months	Mental health symptoms (standardized average of psychiatric problems score (ASI), depression symptoms score (DIS), and psychotic symptoms score (PERI))	Substance use in the past 30 days (number of days drunk, number of days of drug use, and expenditures on substance use); alcohol problems (ASI); drug problems (ASI)	=	Days homeless in last 60 days
Secondary analysis of RCT data	Secondary analysis of good quality study; intervention examined is not the one randomly allocated in the original RCT	Enrolled: N=1618 Analyzed: n=1348 Subjects with payee: n=269 Subjects without payee: n=663 Subjects without benefits: n=416 Male: 69% Mean age: 38 years					
Shaner (1997) ⁶⁰	Poor	Homeless male outpatients with schizophrenia and cocaine dependence who were enrolled in a comprehensive treatment program	Subjects underwent urine testing for cocaine 5 days a week and were observed during 2 month control period, 2 month intervention period (I) during which subjects were paid \$25 for each negative test, and second 2 month control period	Psychotic symptoms (10-point Likert scale) For 1 out of 2 subjects ^b	Proportion of urine tests positive for cocaine For 2 out of 2 subjects ^b	I ^b	
Longitudinal study with A-B-A design (baseline, intervention, and follow-up phases)	Sample size <50 per group	Enrolled: N=2 Male: 100% Mean age: 41 years	Follow-up: 100% at 6 months				

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Blankertz (1992) ⁶¹	Poor	Homeless persons with mental illness and substance abuse, referred to a psychosocial rehabilitation program	Control: Psychosocial rehabilitation for dually diagnosed homeless persons	Social functioning	=	On-site fights, other crises, and psychiatric hospitalizations	I
Retrospective study comparing outcomes among groups receiving different treatments	Measurement instruments not reliable/valid	Enrolled: N=147 Male: 64% Mean age: 33 years	Intervention: Same program, after revisions intended to engage clients in treatment, individualize intervention plans, provide external support systems and positive reinforcements, and increase continuity of care				

Follow-up: 5–6 months

Notes: Group(s) with a significantly better outcome are identified as follows: C, Control; I, Intervention 1; 12, Intervention 2. An equals sign (=) indicates no significant difference between groups. For service utilization, better outcomes were defined as lower utilization of inpatient and emergency department services and higher utilization of outpatient services and substance abuse treatment programs, unless otherwise specified. For housing status, better outcomes were defined as less time spent living on the street, less time spent homeless, more time spent in stable housing, or higher housing stability.

^a Key reasons for quality rating are listed only if the study received a quality rating of fair or poor.

^b Indicates details are provided in a note within that entry in the table.

- ASI, Addiction Severity Index
- BPRS, Brief Psychiatric Rating Scale
- BSI, Brief Symptom Inventory
- CES-D, Center for Epidemiologic Studies-Depression Scale
- CSEI, Coopersmith Self-Esteem Inventory
- CSI, Colorado Symptom Index
- DAFBC, Drug and Alcohol Follow-Back Calendar
- DIS, Diagnostic Interview Schedule
- HSI, Housing Stability Index
- LDS, Life Domains Scale
- LQOLS, Lehman Quality of Life Scale
- MHI-5, Mental Health Index-5
- NHP, Nottingham Health Profile
- PBS, Problem Behaviors Scale
- PERI, Psychiatric Epidemiology Research Interview
- PESQ, Personal Experience Screening Questionnaire
- PSNAS, Personality and Social Network Adjustment Scale
- RADS, Reynolds Adolescent Depression Scale
- RCT, randomized controlled trial
- RSES, Rosenberg Self-Esteem Scale
- SCL-90(R), Symptom Checklist-90 (Revised)
- SMAS, Shortened Manifest Anxiety Scale
- TSI, Treatment Services Inventory
- VA, Veterans Affairs
- YSR, Youth Self-Report Inventory

Appendix E. Summary Evidence Table: Other Interventions for Homeless People

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
INTERVENTIONS FOR HOMELESS PEOPLE WITH TUBERCULOSIS (TB)							
Pilote (1996) ⁶² RCT	Good	Homeless persons with latent TB based on positive tuberculin skin test (TST) Enrolled: N=244 Intervention 1: n=82 Intervention 2: n=83 Control: n=79 Male: 84% Median age: 39 years	All subjects were given a referral to the TB clinic and bus tokens Intervention 1: Monetary incentive (\$5) at time of first attendance at TB clinic Intervention 2: Peer health advisors to contact and accompany clients to clinic appointment Control: Usual care Follow-up: 100% ascertainment of clinic attendance within 3 weeks of enrolment			Adherence to first appointment at TB clinic	11 and 12

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Tulsky (2004) ⁶³ RCT	Good	Homeless persons and residents of low-cost residential hotels with latent TB based on positive TST, for whom DOPT was clinically indicated Enrolled: N=119 Intervention 1: n=65 Intervention 2: n=54 Male: 85% Median age: 41 years Homeless: 79%	All subjects received twice-weekly directly observed preventive therapy (DOPT) for 4–6 months at a community outreach site Intervention 1: Cash incentive (\$5) at each DOPT visit Intervention 2: Non-cash incentive (value \$5) at each visit Follow-up: 100% ascertainment of completion/noncompletion of DOPT			Completion of DOPT	=
Tulsky (2000) ⁶⁴ RCT	Poor Sample size <50 per group This study met all criteria for good quality except for sample size	Homeless persons and residents of low-cost residential hotels with latent TB based on positive TST, for whom DOPT was clinically indicated Enrolled: N=118 Intervention 1: n=43 Intervention 2: n=37 Control: n=38 Male: 86% Median age: 37 years Homeless: 67%	All subjects received twice-weekly DOPT for 6 months at a hospital-based TB clinic Intervention 1: Cash incentive (\$5) at each DOPT visit Intervention 2: Peer health adviser to maintain contact with subjects and encourage adherence to treatment Control: Usual care Follow-up: 100% ascertainment of completion/noncompletion of DOPT			Completion of DOPT	II

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Polesky (1996) ⁶⁵	Poor	Homeless persons and shelter workers who had positive TST but not active TB, during an outbreak of INH- and streptomycin-resistant TB among homeless people	Intervention 1: Treatment with isoniazid alone Intervention 2: Treatment with rifampin, with or without isoniazid Control: No anti-TB therapy	Incidence of active TB			I2
Retrospective study comparing outcomes among groups receiving different treatments	Sample size <50 per group Potential confounders not accounted for	Enrolled: N=204 Intervention 1: n=38 Intervention 2: n=86 Control: n=71	Mean Duration of Follow-up: I1=31 months I2=27-29 months C=24 months				
		Male: 82% Mean age: 37 years					
		Homeless: 84%					
Diez (1996) ⁶⁶	Poor	Patients with active TB living in a low-income inner-city area of Barcelona (Ciutat Vella) who were unemployed, alcohol-dependent, injection drug users, or homeless	Intervention: Social support and health care program including clinical follow-up, directly observed treatment (DOT), full-time social worker, and residential facility providing food and housing for up to 20 patients (available only to residents of Ciutat Vella) Control: Time period before the institution of intervention program	Incidence of active TB among homeless people, per 100,000 total population: in Ciutat Vella I in rest of Barcelona =			
Retrospective study comparing outcomes among groups receiving different treatments	Potential confounders not accounted for	Intervention: N=210 Male: 92% Mean age: 42 years Homeless: % not stated	Follow-up: Not applicable				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Kong (2002) ⁶⁷	Poor	Homeless persons staying at 10 shelters and residential drug and alcohol treatment programs	Intervention: Introduction of mandatory TB screening by symptom assessment and TST of all residents. Persons with positive TST received DOPT if clinically indicated, and persons with active TB received DOT	Incidence of active TB among homeless people in Denver			
Retrospective study comparing outcomes among groups receiving different treatments	Potential confounders not accounted for	Estimated homeless population in Denver: in 1995: N=3330 in 1998: N=5792 Male: not stated Mean age: not stated	Control: Time period before introduction of mandatory TB screening Follow-up: Not applicable	Annual proportion of cases among homeless people due to recent transmission (% clustered within a 2-year period of a preceding case with the same DNA fingerprint)			

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
INTERVENTIONS FOR HOMELESS OR RUNAWAY YOUTHS							
Rotheram-Borus (1991) ⁶⁸	Fair	Homeless adolescents age 11–18 years at two shelters for runaways	Intervention: Small-group HIV-risk reduction program delivered over 20 sessions, designed to increase knowledge and develop social skills to promote strategies to reduce the risk of sexually acquired HIV infection			Sexual abstinence	=
Rotheram-Borus (2003) ⁶⁹	Follow-up <80% at end of study	Enrolled: N=197 Intervention: n=118 Control: n=79	Control: Usual care, including counseling that did not specifically address HIV prevention			Consistent condom use	I
Prospective longitudinal study with nonrandomized allocation	Not an intention-to-treat analysis; subjects classified by number of educational sessions attended	Male: 42% Mean age: 15.5 years				HIV risk behaviors (low rate of condom use and multiple sexual encounters and/or partners)	I
			Follow-up: 74% at 3 and/or 6 months				
			Note: Subjects from the 1991 study (69) were included among the subjects described in the 2003 study (70). Because the 1991 study (69) was judged to be methodologically superior, all data summarized here are based on the 1991 study (69)				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Cauce (1994) ⁷⁰	Fair	Homeless youth using community drop-in center for runaways age 11–20 years	Intervention 1: Intensive case management by social worker (maximum case load of 12 clients), enhanced supervision of case manager, and access to flexible funds to help meet youths' needs	Behavioral problems (YSR)	Alcohol Use and Drug Use (PESQ)	=	=
RCT	Follow-up <80% at end of study	Enrolled: N=229 Analyzed: n=115 Intervention 1: n=55 Intervention 2: n=60 Male: 57% Mean age: 16.5 years	Intervention 2: Regular case management by worker (maximum case load of 30 clients) Follow-up: 50% at 3 months	Anti-social problem behaviors (PBS) Depression (RADS) Self-esteem (RSES)	=	=	=
				Quality of life (LDS)			

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Smith (1995) ⁷¹ RCT	Good	Substance-abusing homeless mothers (83% with cocaine use disorder, 47% with alcohol use disorder) with young children in their care Enrolled: N=149 Intervention 1: n=67 Intervention 2: n=82 Male: 0% Mean age: 30 years Mean number of children per family: 3.7	INTERVENTIONS FOR HOMELESS FAMILIES / CHILDREN All families attended a day program. Mothers participated in a modified therapeutic community, including group and individual treatment and a 12-step program Intervention 1: Mother and children lived in residence at the program site Intervention 2: Mother and children lived elsewhere (usually at a homeless shelter or with family) and commuted to the day program Follow-up: 90% at 18 months		Alcohol use score (ASI) Drug use score (ASI)		Housing stability score

Study reference and design	Quality rating and key reasons ^a for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Reilly (2004) ⁷² Graham-Jones (2004) ⁷³	Analysis of health care utilization: Fair ⁷⁴ Not all potential confounders accounted for	Homeless adults staying at shelters and hotels in the catchment area of a primary health care center	A health advocate provided referrals to community service and housing agencies, and other assistance	Quality of life (NHP): emotional distress, sleep scales		Contacts with General Practitioner (GP); home visits by GP	I ^b Housed or "achieved positive housing outcome"
Prospective longitudinal study with nonrandomized allocation		Enrolled: N=400 (68% parents with children) Intervention 1: n=155 Intervention 2: n=96 Control: n=149	Intervention 1: Health advocate made outreach visits to shelters and hotels to provide services to newly arrived homeless adults and register them with the health center Intervention 2: Health advocate offered services when homeless adults registered with the health center to obtain care	social isolation scale energy, pain, and physical mobility scales		Number of different medications prescribed Referrals to other agencies	I ^b I ^b
	Analysis of quality of life: Poor ⁷⁵ A limited subgroup of study participants were analyzed for quality of life outcomes; sample size <50 per group	Analyzed for quality of life outcomes: N=117 Intervention 1: n=53 Intervention 2: n=22 Control group: n=42 Male: 24% Mean age: 27 years	Control: Usual care after the homeless adult registered with the health center to obtain care Follow-up: 100% ascertainment of health care utilization at 3 months; 53% at 3 months for quality of life outcomes	Life Fulfillment Scale Delighted-Terrible Faces Scale		Contacts with nurse at health center Emergency department visits Lower use of outpatient services was defined as a desirable outcome ^b	= = = = = =

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Sacks (2004) ⁷⁴	Poor	Mothers with substance abuse who were homeless or at-risk for homelessness	Intervention 1: Residential therapeutic community at 2 program sites, with special programs on parenting, work, housing stabilization, and supportive community	Psychological distress (BDI, SCL-90R, ASI)	Substance use	HIV risk behaviors	Housing stabilization on measure (incorporated data on number of residences, days in each residence, current homelessness, and help in finding/keeping housing)
Prospective longitudinal study with nonrandomized allocation	Sample size <50 per group Follow-up <80% at end of study	Enrolled: N=196 Intervention 1: n=77 Intervention 2: n=71 Analyzed: N=49 (subgroup based on propensity score) Intervention 1: n=28 Intervention 2: n=21 Male: 0% Mean age: 33 years Homeless: 62% of subjects had a history of homelessness	Intervention 2: Standard residential therapeutic community at 2 program sites Follow-up: 76% at 12 months	Health status			

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Watson (2000) ⁷⁵ Retrospective study comparing outcomes among groups receiving different treatments	Poor Sample size <50 per group	Children 1–12 years old who were susceptible to varicella (no history of previous varicella or varicella vaccine) who were living at a homeless shelter with two index cases of varicella among residents Enrolled: N=43 Intervention: n=42 Control: n=1 Male: Not stated Age: 1–4 years: n=21 5–9 years: n=20 10–12 years: n=2	Intervention: Varicella vaccine given about 36 hours after the onset of rash in the index cases Control: No varicella vaccine given Follow-up: 100% at 42 days (2 incubation periods)	Varicella attack rate (percentage of children with acute onset of typical rash) Vaccine effectiveness (attack rate in unvaccinated children minus attack rate in vaccinated children, divided by attack rate in unvaccinated children)			
Davey (2001) ⁷⁶ RCT	Poor Sample size <50 per group Follow-up <80% at end of study	Children age 6–11 years living at family shelters Enrolled: N=52 Intervention: n=24 Control: n=28 Male: 66% Mean age: 8.5 years	Intervention: Small group training (4 weekly sessions) teaching age-appropriate stress-reduction and relaxation techniques Control: Daily after-school tutoring by volunteers Follow-up: 77% at 2 weeks after program completion (6 weeks after baseline) Intervention: 92% Control: 64%	Internalizing subscale, externalizing subscale, social competence scale (Child Behavior Checklist) Self-esteem (CSEI)			

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Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Tischler (2002) ⁷⁷	Poor	Families (parents and children) newly admitted to homeless shelters and staying for longer than one week	Intervention: Mental health outreach service that provided assessment and treatment of homeless families, liaison with appropriate agencies, and training or shelter staff within 3 weeks of shelter admission	Parent's mental health (General Health Questionnaire)	=		
Prospective longitudinal study with nonrandomized allocation	Sample size <50 per group Potential confounders not accounted for	Enrolled: N=54 Intervention: n=23 families (44 children) Control: n=31 families (49 children)	Control: Usual care Follow-up (parents): 67% at 6 months Intervention: 78% Control: 58%	Children's mental health (Strengths and Difficulties Questionnaire)			
	Follow-up <80% at end of study	Male (parents): 20% Mean age: not stated	Follow-up (children): 58% at 6 months Intervention: 61% Control: 55%				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
HOMELESS WOMEN							
Nyamathi (1998) ⁷⁸	Fair	Women at homeless shelters (64%) and residential drug treatment programs (36%) who had a supportive partner willing to participate	All women received culturally sensitive small-group AIDS education program (8 weekly sessions with reinforcement sessions at 6 and 12 months)	Psychological well-being (MHI-5)	HIV risk behaviors:	HIV risk behaviors:	
RCT	<80% at end of study	Enrolled: N=242 Intervention 1A: n=65 Intervention 2A: n=60 Intervention 1B: n=58 Intervention 2B: n=59	Intervention 1A: Education program, for women alone Intervention 2A: Education program plus additional sessions on coping strategies, for women alone Intervention 1B: Education program, for women and their supportive partners Intervention 2B: Education program plus additional sessions on coping strategies, for women and their supportive partners	Depression (CES-D)	injection drug use noninjection drug use	sex without condoms multiple sexual partners	= = =
		Male: 0% Mean age: 35 years Homeless: 64%	Follow-up at 12 months: Intervention 1A and 1B: 68% Intervention 2A and 2B: 71%				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Nyamathi (2001) ⁷⁹	Fair	Homeless women living in shelters, with an intimate partner willing to participate in the study	All subjects were offered HIV testing with pre-test and post-test counseling	Psychological well-being (MHI-5)	HIV risk behaviors:	HIV risk behaviors:	
RCT	<80% at end of study	Enrolled (women and partners): N=948 Intervention 1: n=258 Intervention 2: n=360 Control: n=330	Intervention 1: Small-group HIV-risk reduction program (6 weekly sessions) led by a peer mentor and an outreach worker Intervention 2: Same as intervention 1, but led by a female nurse and an outreach worker	Depression, anxiety (BSI) and C	noninjection drug use	sex without condoms	=
		Male: 0% (93% of partners) Mean age: 34 years (for women)	Control: HIV testing only Follow-up: 67% at 6 months Intervention 1: 78% Intervention 2: 67% Control: 64%	Hostility (BSI) Self-esteem (CSEI)	Drug and alcohol use (Drug History Form)	multiple sexual partners	=

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Redelmeier (1995) ⁸⁰ RCT	Good	Homeless adults presenting to a hospital emergency department Enrolled: N=133 Intervention: n=65 Control: n=68 Male: 83% Mean age: 37 years	HOMELESS PERSONS AT EMERGENCY DEPARTMENTS OR ADMITTED TO HOSPITAL Intervention: "Compassionate care" from a trained student volunteer who initiated conversation with the patient, listened attentively, and offered food. Volunteer provided no medical advice. Homeless patients and emergency department staff were not informed that the study was being conducted Control: Usual care			Number of return visits to emergency departments per month Overall rate of return to any emergency department	I
			Follow-up: 100% ascertainment of use of emergency departments in the region over 4–8 month period after randomization				

Study reference and design	Quality rating and key reasons ^a for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
McGuire (2000) ⁸¹	Fair	Patients discharged from inpatient wards at a large urban VA Medical Center	Intervention: Homeless patients who were discharged to a community housing facility (hospital hotel or "hoptel") providing up to 2 weeks accommodation to facilitate transition to other living arrangements			Length of stay in hospital (adjusted for illness severity and other patient characteristics)	=
Retrospective study comparing outcomes among groups receiving different treatments	Groups assembled initially were not entirely comparable	Enrolled: N=7027 Intervention (homeless patients): n=441 Control (nonhomeless patients): n=6586	Control: Nonhomeless patients who were discharged to their homes				
	Study compared homeless and nonhomeless patients based on the assumption that equalization of length of stay would constitute evidence of effectiveness. Study would be rated poor quality if this comparison were deemed inappropriate	Intervention group: Male: 99% Mean age: 49 years	Follow-up: Not applicable				

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
OTHER STUDIES							
Foucault (2003) ⁸²	Poor	Homeless adults at hospitals and shelters who had a blood culture positive for <i>Bartonella quintana</i>	Intervention: Gentamicin 3 mg/kg intravenously once daily for 14 days, plus doxycycline 200 mg orally once daily for 28 days Control: No antibiotic treatment			Eradication of <i>B. quintana</i> bacteremia	I
RCT	Sample size <50 per group	Enrolled: N=20 Intervention: n=9 Control: n=11 Male: 75% Mean age: 54 years	Follow-up: 80% at 90 days Intervention: 78% Control: 82%				
Cotman (1997) ⁸³	Poor	Homeless adults participating in a residential program for potentially employable persons without mental illness	Intervention: 12---36 training sessions using a computer program designed to remediate attention and memory deficits Control: No training	Neuro-psychological functioning: 4 of 6 measures			I
Prospective longitudinal study with nonrandomize d allocation	Sample size <50 per group Potential confounders not accounted for Follow-up <80% at end of study	Enrolled: N=35 Analyzed: n=24 Intervention: n=15 Control: n=9 Male: 54% Mean age: 31 years	Follow-up: 69% at 2---3 months	2 of 6 measures			=

Study reference and design	Quality rating and key reasons for rating ^a	Study participants	Interventions and follow-up	Health status outcomes	Substance use outcomes	Service use and other outcomes	Housing status
Toro (1997) ³⁴	Poor	Homeless adults (including unattached adults, couples, and parents with children) referred by human service agencies	Intervention: 4--8 month intensive case management program providing linkage to services, job training and placement, housing placement, and assistance with immediate needs Control: Usual care	Physical health (Physical Health Symptoms Checklist) Psychological symptoms (SCL-90R)	Alcohol consumption		Days homeless in last 6 months Housing quality score
RCT	Follow-up <50% at end of study	Enrolled: N=202 (households) Intervention: n=101 Control: n=101 Male: 58% Mean age: 32 years	Follow-up: 49% at 18 months Intervention: 50% Control: 49%	Psychological symptoms (BPRS)			
Tollett (1995) ³⁵	Poor	Homeless veterans admitted to a homeless evaluation unit at a VA Medical Center	Intervention: 12-session small-group nurse-led intervention designed to instill hope Control: Usual care (wait-list controls, prior to receiving intervention)	Stress (Modified Life Events Interview) Self-efficacy (Self-Efficacy Scale)			
RCT	Sample size <50 per group	Enrolled: N=40 Analyzed: n=33 Intervention: n=20 Control: n=13 Male: 100% Mean age: 47 years	Follow-up: 83% at 4 weeks	Hope (Miller Hope Scale) Self-efficacy (Self-Efficacy Scale) Self-esteem (RSES) Depression (BDI)			

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Notes: Group(s) with a significantly better outcome are identified as follows: C, Control; 1, Intervention; 11, Intervention 1; 12, Intervention 2. An equals sign (=) indicates no significant difference between groups. For service utilization, better outcomes were defined as lower utilization of inpatient and emergency department services and higher utilization of outpatient services and substance abuse treatment programs, unless otherwise specified. For housing status, better outcomes were defined as less time spent living on the street, less time spent homeless, more time spent in stable housing, or higher housing stability.

^a Key reasons for quality rating are listed only if the study received a quality rating of fair or poor.

^b Indicates details are provided in a note within that entry in the table.

ASI, Addiction Severity Index	PBS, Problem Behaviors Scale
BPRS, Brief Psychiatric Rating Scale	PERI, Psychiatric Epidemiology Research Interview
BSI, Brief Symptom Inventory	PESQ, Personal Experience Screening Questionnaire
CES-D, Center for Epidemiologic Studies-Depression Scale	PSNAS, Personality and Social Network Adjustment Scale
CSEI, Coopersmith Self-Esteem Inventory	RADS, Reynolds Adolescent Depression Scale
CSI, Colorado Symptom Index	RCT, randomized controlled trial
DAFBC, Drug and Alcohol Follow-Back Calendar	RSES, Rosenberg Self-Esteem Scale
DIS, Diagnostic Interview Schedule	SCL-90(R), Symptom Checklist-90 (Revised)
HSI, Housing Stability Index	SMAS, Shortened Manifest Anxiety Scale
LDS, Life Domains Scale	TSI, Treatment Services Inventory
LQOLS, Lehman Quality of Life Scale	VA, Veterans Affairs
MHI-5, Mental Health Index-5	YSR, Youth Self-Report Inventory
NHP, Nottingham Health Profile	

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