

# Co-Occurring Severe Mental Illness and Substance Use Disorders: A Review of Recent Research

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**Objective:** Understanding the complex diagnostic and treatment issues posed by the co-occurrence of severe mental illness and substance use disorders has become a necessary exercise in current psychiatric practice. The authors reviewed research studies from the past six years that have contributed to our knowledge about effective assessment, diagnosis, course of illness, and treatment approaches. Research on special populations, including women, persons infected with HIV, and violent patients, is highlighted. **Methods:** PsycINFO, Silver Platter, and MEDLINE were used to search for English-language studies published in the United States and other countries. To augment the search, selected bibliographies were reviewed with a focus on clinical standards. Information was sought on epidemiology, screening and assessment strategies, course of illness, models of treatment delivery, and cost of care. **Results and conclusions:** Although estimates of the prevalence of substance use disorders vary by population, a higher prevalence among persons with severe mental illness has been confirmed. Routine screening for and assessment of substance use disorders among persons with severe mental illness has become the accepted standard of care. The course of severe mental illness is negatively influenced by a substance use disorder, and an integrated approach to the treatment of both disorders is generally accepted to be the most promising treatment strategy. Components of this strategy include harm reduction, treatment in stages, motivational interviewing, cognitive-behavioral interventions, and modified 12-step self-help groups. (*Psychiatric Services* 50:1427-1434, 1999)

For the past 20 years, clinicians and researchers alike have tried to understand the complex diagnostic and treatment issues posed by the co-occurrence of severe mental illnesses and substance use disorders. About 50 percent of individuals with severe mental illnesses will develop a substance use disorder

at some point during their lives, and about half will exhibit current substance abuse or dependence (1,2). It is now well established that the abuse of drugs and alcohol by persons with severe mental illnesses has a wide range of adverse impacts on the course of mental illness and psychosocial functioning, resulting in poor compliance

with treatment, poor prognosis, and higher rates of utilization of acute services leading to more costly care.

Six years ago, a series of articles on the state of knowledge about co-occurring severe mental illnesses and substance use disorders that were published in this journal were reprinted in a compendium (3). Since then, the accelerating pace of research on the co-occurrence of these disorders has led to new insights about their prevalence and about approaches to screening, assessment, and treatment. In this update, we highlight new and emerging findings from this research that we believe are particularly relevant for clinicians.

## Methods

A computerized search of the bibliographic databases PsycINFO, Silver Platter, and MEDLINE was conducted using as key words dual diagnosis, substance abuse, mental illness, alcoholism, and drug abuse. The search was supplemented with a review of the annotated bibliography prepared in 1997 by a panel on dual diagnosis chaired by Kenneth Minkoff, M.D., for the managed care clinical standards and workforce competencies project of the Center for Mental Health Services.

Studies from 1992 through January 1999 were the focus of the overall review. Studies that were selected for review included those found to be clinically relevant because they introduced new ideas or approaches to the assessment, diagnosis, or treatment of co-occurring disorders.

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## Findings

### *Epidemiology*

Estimates of the prevalence of substance use disorders among psychiatric patient populations vary widely, reflecting factors such as the use of samples with acute versus nonacute illnesses, the geographic site of studies (for example, urban versus rural or West versus East), and the availability of illicit drugs in the study location. Studies in the United States confirm that the prevalence of substance use disorders among patients with severe mental illness is higher than in the general population (2). This finding has been corroborated by the National Comorbidity Survey (4).

A second finding with major clinical implications is that the co-occurrence of severe mental illness and substance use disorders is associated with an increased probability of receiving some kind of treatment. The 1992 National Longitudinal Alcohol Epidemiologic Survey (5) showed that respondents with past-year alcohol use disorders were twice as likely to seek help for their alcohol problems if they also had either a comorbid drug use disorder or major depression, and they were five times more likely to seek help when both comorbid conditions were present (5).

International prevalence studies have revealed that persons with severe mental illness have significantly higher rates of substance use—particularly of alcohol, cannabis, and amphetamines—than the general population (6,7). Such studies suggest that the consequences of substance abuse among patients with severe mental illness may be mediated by differences in the types of mental health services available in these countries.

For example, Fowler and associates (8) found higher rates of alcohol, cannabis, and amphetamine use among patients with schizophrenia relative to the general population in Australia. The researchers also found that although younger males with more involvement with the criminal justice system used substances, they did not report increased risk for suicide or hospitalization, in contrast to findings in many U.S. studies. Such differences in consequences could be attributable to the treatment strategies

of the Australian mental health system, which places greater reliance on the use of mobile crisis treatment units for in-home management of acute psychotic episodes.

### *Screening and assessment*

**Screening.** Patients with severe mental illnesses should receive routine screening for any regular use of nonprescribed psychoactive drugs for three reasons (9). First, attempts at controlled use of psychoactive substances by individuals with severe mental illness are likely to lead to a substance use disorder over time (10). Second, use of even small amounts of alcohol or other drugs is likely to be associated with negative outcomes among these individuals. Finally, persons with severe mental illness are likely to be unaware of or confused about the consequences of their substance use, and any report of regular use is likely to be associated with substance use disorder (11).

A variety of self-report screens for substance use disorders can be completed as part of an initial intake interview for a patient with a severe mental illness. Among them are brief instruments such as the Drug Abuse Screening Test (12), the Michigan Alcoholism Screening Test (MAST) (13), the CAGE questionnaire (14), and the Dartmouth Assessment of Life Style Instrument (15). However, a clear consensus supports combining the use of self-reports with collateral reports and laboratory tests (9).

**Assessment.** One of the more commonly used standardized assessment instruments in the substance use disorder field is the Addiction Severity Index (ASI) (16). Appleby and colleagues (17) examined the validity of the ASI in a sample of 100 patients consecutively admitted to a public mental hospital, two-thirds of whom had a diagnosis of a psychotic disorder. In that study, the ASI was compared with the CAGE questionnaire, a drug abuse version of the CAGE, the Chemical Abuse and Dependence Scale, the short form of the MAST, and the Drug Abuse Screening Test. The researchers found strong correlations between the ASI and the other scales and concluded that even with a minimum cut-off

score, the ASI alcoholism scale is diagnostically as accurate as the CAGE or the short MAST for outpatients with psychiatric illnesses.

However, recent studies have raised questions about the performance of the ASI. Lehman and colleagues (18) compared the performance of the ASI with that of the Structured Clinical Interview for DSM-III-R in a sample of 435 inpatients at two inner-city psychiatric hospitals. The researchers used receiver operating characteristic analysis, which permitted assessment of the optimal threshold of ASI alcohol and drug composite scores to detect DSM-III-R substance use disorders. They found that the sensitivity values for the ASI alcohol and drug use composite scales at extremely low ASI scores (.01) are only .81 and .82, respectively. They concluded that the ASI should not be used by itself to detect substance use disorders among psychiatric inpatients. Zanis and associates (19) made similar observations in an examination of the validity and the test-retest and interrater reliabilities of the ASI in a sample of 62 outpatients with severe mental illness.

Corse and colleagues (20) described a qualitative study of subject and interviewer reactions to and perceptions about the ASI. They found that the ASI appears to underestimate subjects' substance abuse problems for three reasons. First, the definition of "regular use" used in assessing substance use imposes a cutoff of at least three times a week. Although this cutoff works well for the general population, patients with severe mental illness may exhibit patterns of less frequent weekly use that are associated with more serious consequences but that are not picked up.

Second, the ASI lacks questions that explore the interactive effects of severe mental illness and substance use. Finally, the drug and alcohol treatment history elicited by the instrument assumes that this treatment is delivered in the alcohol and drug specialty treatment sector, whereas most treatment for patients with severe mental illness occurs in medical or mental health settings.

The researchers offered specific suggestions for making the ASI more

relevant for assessments of patients with severe mental illness. They include creating a psychiatric symptom checklist; adding questions about isolation, estrangement, and patients' relationships to the social and family problems sections; shortening the intervals over which respondents have to report their housing arrangements; and probing the extent to which patients rely on others.

Carey and associates (21) reported preliminary data on the use of the Time Line Follow Back, which uses a calendar and various aids to memory to help patients recall their use of alcohol and other substances over time intervals of varying lengths (22). Carey and associates compared results of the Time Line Follow Back over a 30-day interval with results of the ASI's 30-day assessment of alcohol use in a sample of 79 outpatients with severe mental illness. They found an excellent level of agreement between the two assessment instruments (kappa coefficient of .79), and a correlation of .75 between the two approaches on the number of days respondents reported that they had been drinking. The Time Line Follow Back procedure may actually yield higher estimates of drinking than the ASI for a 30-day interval (23). Given that even moderate amounts of alcohol or other substance use may lead to adverse consequences for persons with severe mental illness, the Time Line Follow Back appears to offer a highly promising assessment approach that should be further examined in future research.

**Self-reports.** The screening and assessment instruments discussed above rely on the use of self-reports, a source of data that continues to be viewed with suspicion by many clinicians and researchers. However, an important shift in perspective on the use of self-reports is taking place. The old question of whether self-reports are valid is being replaced by questions about when and under what circumstances self-reports of substance use are likely to be valid and reliable.

Shaner and colleagues (24) conducted an open trial with 108 subjects with schizophrenia using supplements to a routine clinical evaluation that included a semistructured inter-

view for recent and lifetime use of alcohol and other drugs. Clinicians failed to recognize cocaine use among 30 percent of the patients who denied cocaine use but whose urine toxicology tests were positive for cocaine. The poor reliability of the self-reports highlights the need for collection of collateral information.

Specific recommendations for improving self-report data include ensuring the sobriety and mental stability of the respondent when the assessment is being conducted, using interview approaches rather than paper-and-pencil self-report instruments, using verification techniques and multiple sources of data, establishing adequate rapport between interviewer and respondent, and providing respondents with assurances of confidentiality.

### **Course of the illnesses**

Empirical evidence strongly supports the adverse effects of substance abuse on the course of severe mental illnesses. The consequences of substance abuse for patients include symptom exacerbation, increased hospitalization, medication noncompliance, disruptive behaviors, and decreased social functioning (25). In a longitudinal study of 161 subjects with a diagnosis of schizophrenia, Owen and colleagues (26) found that at six-month follow-up, subjects with substance abuse were 8.1 times more likely to be noncompliant with their medications than those without substance abuse ( $p < .001$ ). Further, the combination of current substance abuse, medication noncompliance, and no outpatient contact was associated with worse symptom severity at six-month follow-up.

Several longitudinal studies completed during the past five years have examined the natural course and prognosis of substance abuse among patients with severe mental illnesses. A major goal of these naturalistic studies is to determine rates of remission of substance use disorders in the absence of targeted treatment.

Dixon and associates (27) conducted a prospective study that compared the substance abuse patterns of inpatients with severe mental illness who had a current substance use disorder

with those who had a past substance use disorder. Patients were evaluated at inpatient admission and at a one-year follow-up. Patients with a current substance use disorder at baseline were significantly more likely to experience a recurrence of the disorder, were more likely to use treatment services for substance use disorders, and had more months of alcohol use than patients with a past substance use disorder. In contrast, patients with a past substance use disorder were more likely to remain in stable remission over the one-year period, thus supporting the idea that a stable remission can be achieved and maintained by these patients. Of particular importance was the finding that even if all of the subjects lost to follow-up were assumed to have relapsed, the projected estimate of patients in stable recovery was 50 percent.

Bartels and associates (28) conducted a prospective, naturalistic seven-year follow-up study of outpatients with severe mental illness who were receiving mobile community-based treatment services. The researchers assessed alcohol and drug use at baseline and seven-year follow-up. They found no significant differences in the proportion of subjects meeting criteria for a current substance use disorder between baseline and follow-up.

Four additional naturalistic follow-up studies in which substance abuse was not targeted for treatment but was assessed over one or more years were reviewed (29–32). In all studies no differences in the level of abuse between baseline and follow-up were found.

### **Clinical issues**

#### *Substance use and violent behavior*

Past research has identified several risk factors for violence in the presence of mental illness, including increased hostility, noncompliance with treatment, negative attitudes toward treatment, and contact with the legal system (33–35). Substance use disorders are now emerging as an important risk factor for violent behavior as well. For example, data from the Epidemiologic Catchment Area (ECA) study indicated that the prevalence of violence among persons with schizo-

phrenia is 12.7 percent, 24.5 percent among persons with alcohol use disorder, and 34.7 percent among persons with a drug use disorder, compared with 2 percent in the general population (2). However, the ECA findings are a result of cross-sectional studies and fail to demonstrate a causal relationship.

Recent longitudinal studies also support the correlation of increased violence and substance use among persons with severe mental illness. In a longitudinal 18-month study involving 103 subjects with diagnoses of schizophrenia, schizoaffective disorder, or schizophreniform disorder, Cuffel (36) found that polysubstance use was significantly associated with occurrence of community violence. Persons with a schizophrenia-spectrum illness who used more than one drug had a 12 times greater chance of becoming violent, compared with persons with schizophrenia who did not. In contrast, no increase in violence was observed among subjects who used alcohol or marijuana.

Steadman and colleagues (37) examined the nature and timing of violent behavior among patients discharged from acute care mental health facilities at three U.S. sites and sought to determine whether it differed from violence committed by other people living in the same neighborhoods. This study differed in three critical ways from earlier research on these questions.

First, Steadman and his colleagues reassessed psychiatric patients with a variety of diagnoses every ten weeks for one year from the date of an index hospital discharge. Patients in the sample were receiving treatment at three research community facilities after hospitalization. The investigators found the incidence of violent behavior was somewhat elevated shortly before, during, and after hospitalization but then diminished rapidly and became virtually indistinguishable from the incidence of violence among the control subjects in the community. Co-occurring mental and substance use disorders were clearly associated with violent behavior. The one-year prevalence of violent behavior among patients with a major mental disorder and no substance use disorder was

17.9 percent, compared with 31.1 percent for patients with a major mental disorder and a substance use disorder and 43 percent for patients with other forms of mental disorders and substance use disorders.

Second, the investigators used multiple measures of violence from independent sources, including arrest records, hospital records, self-reports, and collateral reports. As a result, the authors reported a much higher rate of violence than would have been found from agency records alone. Third, the authors investigated the targets of this violent behavior and found that 86 percent of the violent acts committed by former psychiatric patients occurred within their family and friendship networks at home. This study suggests that the association between mental disorders and violent behavior is temporally limited and that the two key ingredients for breaking this association—treatment and recuperation time—are parameters that clinicians may be able to control (38).

In a randomized clinical trial that evaluated the risk of community violence among 331 recently hospitalized patients with severe mental illness, a combination of substance use and medication noncompliance was significantly associated with serious violent behavior in the four-month period before hospitalization (39).

The association between substance use and increased risk for violent behavior among persons with severe mental illness has also been found outside the United States. In a prospective study in Finland involving a 11,017-person unselected birth cohort through age 26, Rasanen and associates (40) found that men with schizophrenia who abused alcohol were 25.2 times more likely to commit violent crimes than mentally healthy men. Nonalcoholic men with mental illness were 3.6 times more likely to commit violent crimes than the men without any diagnosis.

#### *Risk of HIV infection*

The past decade has seen a growing recognition of higher rates of HIV infection among persons with severe mental illness. Carey (41) reviewed nine studies involving 2,345 patients with psychiatric illness and reported

an overall rate of HIV infection of 8 percent, much higher than the rate of .3 to .5 percent in the general population (42). More recent studies continue to provide evidence of increased HIV risk. Krakow (43) examined HIV risk factors among 147 patients with mental illness and substance abuse. A total of 22 patients, or 19 percent, tested positive for HIV. Women were 3.8 times more likely than men to be HIV positive. Cocaine users were 4.5 times more likely than nonusers to be HIV positive. Implications from this study include the need to provide education about HIV risk factors, substance abuse treatment, and harm-reduction strategies while providing mental health care for this population.

#### *Treatment issues for women*

The increased risk of physical health problems associated with substance use disorders among women has now expanded to include heightened risk for sexually transmitted diseases, including HIV and AIDS, and sexual and physical violence. All of these are felt to be present to a greater degree among women with severe mental illness (44). Such risks may be attributed to the lifestyle accompanying substance use among women, including the exchange of sex for drugs, general prostitution, and the socially biased perception that women who engage in substance use are more sexually available, thereby putting them at greater risk for sexual violence.

At the same time, awareness of the impact of childhood abuse on the subsequent course of substance use and substance use disorders has been growing. At least half of women with severe mental illness report that they experienced sexual abuse before their 18th birthday (45). Women who seek treatment for substance use disorder are more likely to report a family history of instability and physical and sexual abuse than are men who seek such treatment (46,47). Alexander (48) has noted that women with severe mental illness and substance use disorder are more likely to have experienced childhood physical or sexual abuse than women with only severe mental illness.

Another important observation about women with severe mental illness and substance use disorder is

their decreased access to treatment (49). Women admitted to drug and alcohol treatment programs tend to have more severe symptoms of substance use disorder than their male counterparts. In part this difference may be due to selection bias, as women with mental illness and substance abuse problems tend to present to the mental health system and men to the substance abuse system (50). Some research has suggested that substance use disorders are less likely to be detected among women than among men because of the more solitary lifestyle of women with substance use disorders and their decreased likelihood of engaging in antisocial behavior that would attract attention (49).

In an attempt to understand women's treatment outcomes, Brown and colleagues (51) studied the level of burden experienced by women with more than one co-occurring disorder. A total of 260 women admitted with their children to a comprehensive residential drug treatment program were assessed for level of burden, including variables of substance abuse, psychological problems, cognitive impairment, and general health status. Women with higher levels of burden had lower levels of program retention, were more likely to drop out during earlier stages of treatment, and overall derived less benefit from the treatment program. The authors suggested that interventions to increase treatment preparedness might help women with higher levels of burden adjust to and comply with program rules and expectations.

Treatment components that have been identified as important for women with severe mental illness and substance use disorders include screening for accompanying medical problems and an approach that builds on safety and empowerment in the community (52–54). Education about sexuality and pregnancy prevention is critical.

Victimization and homelessness are two issues that must be addressed to reduce these women's risk for further trauma and provide a more stable environment to support recovery (53). Provision of child care, parenting education, family therapy, parallel treatment for children, and the opportunity for children to live in a treatment fa-

cility with their mothers when appropriate should also be considered (55). Women-only groups have been reported to be both therapeutic and supportive because they provide a safe place to talk about issues of violence and abuse (56). Some advocates have argued that women need to receive treatment for substance use disorder in women-only programs (57–60).

### **Treatment delivery models**

The delivery of effective treatment for substance use disorder to persons with severe mental illness continues to be a major challenge. In a recent review of the literature evaluating case management as a model of community care for patients with severe mental illness, Mueser and colleagues (61) found that only six of 75 studies reported on the effect of treatment on substance abuse. Only one of those studies reported that treatment resulted in patients' improvement; the remaining five studies found no difference.

In the debate about appropriate treatment, integrated treatment models, in which treatment for both severe mental illness and substance use disorder is delivered in the same program by the same staff, has generally been contrasted with parallel treatment models, in which a patient is treated for mental illness in one system and for substance use disorder in another. Research during the past five years has contributed to this debate in two important ways—first, by providing limited but cumulative evidence supporting the integrated treatment model generally, and, second, by suggesting specific treatment orientations and components that may be particularly effective in treating patients with severe mental illness and substance use disorder.

### **Support for integrated treatment**

Five pretest-posttest open trials of integrated treatment models that incorporate mental health services, case management, and treatment for substance use disorder have been published (62–66). The studies had follow-up intervals ranging from 18 months to seven years and reported variable improvement in rates of hospitalization and severity of substance use. Durrell and colleagues (62) reported that 66 percent of their sub-

jects had significantly reduced their substance use at 18 months in an integrated treatment program. Meisler and others (63), Drake and colleagues (64), and Bartels and Drake (65) reported that 41 to 61 percent of their subjects had remission of their substance use disorder. Godley and associates (66) demonstrated reduced substance abuse at six, 12, and 18 months and reduced hospitalizations.

Two quasiexperimental studies compared integrated treatment models with other types of services. Drake and colleagues (67) compared outcomes at 18-month follow-up for 158 homeless, seriously mentally ill addicted persons in an integrated treatment program with those for 59 similar subjects receiving parallel treatment services. Individuals in the integrated treatment group spent significantly more days in stable living arrangements and fewer days in institutional settings than those in the parallel treatment group. In addition, subjects with an alcohol use disorder in the integrated treatment program achieved significantly greater improvement at follow-up than those in the parallel treatment group. Finally, patients in the integrated treatment group advanced to significantly later stages of treatment for substance use disorder than did patients in the parallel treatment group, who remained predominantly in the earlier persuasion phase of treatment.

Blankertz and Cnaan (68) conducted a comparison study of two residential programs for 176 homeless, dually diagnosed adults. The experimental program provided integrated mental health and substance abuse treatment within the context of a psychosocial rehabilitation approach emphasizing education and skill development. The control group was treated in a traditional therapeutic community residence based on the 12-step substance abuse model and directed by a drug and alcohol agency, with mental health services provided elsewhere. Patients in the experimental integrated treatment group had significantly higher treatment retention rates than those in the parallel treatment group (81 percent versus 53 percent). Of those who completed at least 60 days of residential treatment in either

group, patients in the integrated treatment program were more likely to attain a successful discharge.

In general, the evidence from all types of studies tends to support the integrated treatment approach for delivering services to patients with severe mental illness and a substance use disorder. However, many of the studies used small samples and included subjects who were homeless. Randomized clinical trials are needed to compare outcomes for nonhomeless clinical patient populations in well-defined and monitored examples of integrated treatment and parallel treatment. To address limitations in the validity of current research on integrated treatment approaches, future studies should use samples with large enough statistical power to enable investigators to detect small to medium-sized treatment effects over multiple follow-up intervals.

#### *Treatment components*

Over the past five years, consensus on the basic principles underlying the provision of services for patients with severe mental illness and substance use disorder has been developing. As program development progresses, a range of promising treatment orientations and components have been identified. They include such strategies as harm reduction (69,70), stage-wise treatment (69,71–78), motivational interviewing (79), cognitive-behavioral interventions (75,80,81), and modified 12-step self-help groups (82,83). Although empirical support for the effectiveness of these components has not been established, it is likely that many of these components will be investigated in research over the next five years.

#### *Costs of treatment*

The cost of treatment for a person with severe mental illness and substance use disorder far exceeds that for an individual with either disorder alone. The major reason for this increased cost is increased use of acute psychiatric services (34,84–86).

Dickey and Azeni (87) examined the annual treatment costs of 16,395 psychiatrically disabled Medicaid beneficiaries with and without a substance use disorder in Massachusetts. Pat-

terns of care and expenditures were collected from three sources: Medicaid paid claims, state hospital record files, and tracking files for clients of community support services. The study compared three groups—claimants with severe mental illness and a substance use disorder who received treatment for both disorders, claimants with severe mental illness and a substance use disorder who received treatment for only severe mental illness, and claimants with only severe mental illness who received treatment for that illness.

The findings showed that claimants with severe mental illness and a substance use disorder were four times more likely to be admitted for acute inpatient psychiatric treatment and spent more days hospitalized than claimants with severe mental illness alone. Comparisons of the annual costs of treatment across the three groups showed significant differences between those with no substance use disorder, for whom the annual cost of care was \$13,930, and those with either a treated or an untreated substance use disorder, for whom annual costs were \$22,917 and \$20,049, respectively.

It is important to note that the vast majority of the cost difference was for psychiatric treatment; only small differences were found in the costs and patterns of treatment for those who were treated for a substance use disorder and those who were not. Overall, total costs for patients who abused substances were twice as high as those for patients who did not.

Leon and associates (88) compared patterns of psychiatric hospitalization for patients with severe mental illness and substance use disorder with those for patients with only severe mental illness in a managed care environment. The majority of the patients were female. Acuteness of illness, response to inpatient treatment, and condition at discharge were found to be similar for both groups. However, the two groups differed in length of stay and rate of readmission. The average length of stay was  $4.8 \pm 2.6$  days for patients with severe mental illness and a substance use disorder and  $7.3 \pm 6.1$  days for patients with no co-occurring substance use disorder. Patients with a substance use disorder had a significantly higher

readmission rate—31.2 percent, compared with 17.1 percent for patients with no substance use disorder. These findings confirm that the revolving door continues to spin even within the context of managed care.

Certain interventions may significantly decrease these acute psychiatric service costs, and the identification of such interventions is an important objective for future research. Jerrell and Ridgely (89) examined the cost-effectiveness of three intervention strategies to augment traditional mental health services: cognitive-behavioral skills training, case management, and a traditional 12-step recovery program. The findings showed that clients in the behavioral skills training group achieved better social adjustment and role functioning and a greater reduction in substance use than those in the 12-step condition. The case management group also did better than the 12-step group in some areas, although not on substance use symptoms.

From a cost perspective, patients in all three groups decreased the number of days they were hospitalized, decreased their number of visits to the emergency room, and increased their use of outpatient mental health services, suggesting that all three intervention strategies had some positive impact. Both the cognitive-behavioral skills group and the case management group had significant reductions in the cost of supportive services compared with the 12-step group. However, the cognitive-behavioral group achieved a significantly lower cost for acute and subacute mental health services than did each of the other two groups. Considering the more effective clinical outcomes and the favorable cost picture of the cognitive-behavioral skills component, this modality appears promising in treatment of severe mental illness and co-occurring substance use disorder.

#### **Conclusions**

The co-occurrence of severe mental illness and substance use disorders continues to be a major public health challenge. Violence and HIV as well as women's issues have begun to receive increased and deserved attention. Detection and assessment strategies that combine self-report

with other data sources have been developed. Integrated treatment approaches are promising, although additional research on their effectiveness is needed. The increased costs of care and poor outcomes associated with co-occurring substance use disorders and mental illness demand the ongoing focus of the public, consumers, researchers, clinicians, payers, and other stakeholders. ♦

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