Intervention Attendance Among Emergency Department Patients With Alcohol- and Drug-Use Disorders*

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ABSTRACT. Objective: The emergency department (ED) visit provides a window of opportunity for screening and linkage to services for inner-city adults with substance-use disorders (SUDs). This article examines predictors of intervention attendance among ED patients who screen positive for an SUD (alcohol or other drug). **Method:** As part of a large randomized control trial, medical and injured patients (ages 19-60) in an inner-city ED completed a computerized screening survey. Based on random assignment, those screening positive for an SUD either were scheduled to attend a post-discharge intervention or received a referral brochure. Interventions (brief motivational intervention vs. case management intervention) focused on linking participants to substance-use treatment. Independent variables assessed included demographics, ED visit reason, health functioning, readiness to change, self-efficacy, and substance use. Intervention attendance (yes/no) was the dependent vari-

able. **Results:** Overall, 957 (62.3% male; 58.3% African-American; $M_{age} = 33.2$ years) were randomized to interventions (brief motivational intervention/case management intervention) and are the focus of subsequent analyses. There were no differences in the pattern of predictors of intervention attendance for brief motivational intervention versus case management intervention. Bivariate analyses compared those who attended the post-ED intervention with those who did not attend. Participants who attended the intervention (50%) were significantly more likely to be older, unmarried, insured, unemployed, and in the "action" stage of change. **Conclusions:** The present findings highlight the relative importance of assessing and attending to readiness to change as well as demographic factors such as insurance and employment (and potentially associated barriers) in ED-based screening, brief intervention, and referral to treatment protocols. (*J. Stud. Alcohol Drugs*, 71, 713-719, 2010)

PRIOR RESEARCH DEMONSTRATES THAT alcohol and drug users are more likely to seek emergency department (ED) care than are nonusers (Cherpitel and Bazargan, 2003; Cunningham et al., 2003; Fuda and Immekus, 2006), providing a window of opportunity for screening, brief intervention, and referral to treatment (SBIRT) for individuals with substance use and/or substance-use disorders (SUDs; Babor et al., 2007). To date, research has been limited to studying the efficacy of brief interventions (BIs) for alcohol problems in the ED (Havard et al., 2008), often excluding patients meeting criteria for an SUD (Babor et al., 2007; Bernstein and Bernstein, 2008; Nilsen et al., 2008). Despite the consensus that ED research on BIs for drug use is needed (Dunn and Ries, 1997; Lang et al., 2000; Weaver et

al., 1999), there are few published ED studies, although data from other settings are promising (Baker et al., 2005; Lang et al., 2000; Marijuana Treatment Project Research Group, 2004; Stotts et al., 2001). Recognizing that ED-based BIs may not be sufficient for patients with SUDs, SBIRT recommendations include post-ED visit interventions to facilitate "linkage" or engagement in specialized SUD treatment. Although studies of general medical patients have found that BIs may increase engagement in SUD treatment (Babor et al., 2007), data from ED samples are generally lacking. A prior ED study (Bernstein et al., 1997) found that a BI plus active referral intervention resulted in a 45% reduction in substance-use problems among patients attending a post-ED visit intervention; this study had few patients with SUDs (37%) and low retention at follow-up (22%). Another study that examined a post-ED visit intervention (Longabaugh et al., 2001) found that 69% attended; patient characteristics did not predict attendance (Baird et al., 2007). Research examining markers of attendance to post-ED visit interventions is needed to refine SBIRT protocols.

A potentially useful conceptual model in understanding compliance with a referral to attend a post-ED visit intervention is the Aday and Andersen model of predisposing, enabling, and need factors (Aday and Andersen, 1974; Andersen, 1995). Predisposing factors include demographic factors, treatment history, and health beliefs. Prior SUD treatment consistently predicts treatment entry (Booth et al., 2000; Hser et al., 1998). Enabling or access factors are the

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individuals' "means," including internal (e.g., self-efficacy) and external barriers (e.g., insurance). SUD treatment entry is limited by such financial barriers (Booth et al., 1998). Need and illness severity factors (e.g., consumption, SUD, readiness for change) significantly predict use of services for SUDs (Hser et al., 1998; Joe et al., 1998; Weisner, 1993). To our knowledge, no studies have examined these predictors of attendance at a post-ED visit intervention.

Thus, the purpose of this study was to identify predictors of attendance at a post-ED intervention visit among inner-city ED patients with SUDs, including predisposing (i.e., health functioning, demographics, reason for ED visit, and treatment history), enabling (i.e., self-efficacy, insurance, and employment), and need factors (i.e., substance use/disorders and readiness to change). Findings will inform ED-based SBIRT protocols for patients with SUDs and could assist in tailoring BI content during the ED visit to increase intervention compliance post-ED visit.

Method

Design

Patients in an inner-city Level 1 ED who screened positive for an SUD (a) completed a baseline assessment, (b) were randomly assigned to a postdischarge intervention (a two-session [60-minute] brief motivational intervention or a five-session [60-minute] strengths-based case management intervention) or enhanced usual care (an enhanced-usual-care brochure), and (c) completed 3- and 6-month assessments. This article reports on predictors of attendance (brief motivational intervention or case management intervention) among participants assigned to interventions; analyses of outcomes from the randomized control trial are ongoing. Study procedures were approved/conducted in compliance with institutional review boards for human subjects. A National Institutes of Health Certificate of Confidentiality was obtained.

Setting, population, and protocol

Patients (ages 19-60) presenting to the ED at Hurley Medical Center in Flint, MI, for medical illness or injury were eligible for screening. Exclusion criteria included pregnancy, chief complaint related to psychiatric conditions (e.g., suicidal ideation or psychosis), abnormal vital signs, or being unable to provide informed consent (e.g., unconscious). Research assistants recruited patients from 9 A.M. to 11:30 P.M., 7 days per week, from November 2005 through January 2009. Consenting participants completed a 10-minute computerized survey and received a \$1 gift (e.g., puzzle books or pens). Participants were eligible for the randomized control trial if they either (a) had an alcohol-use disorder *and* used alcohol in the past month or (b) had a drug-use disorder (i.e.,

cocaine, marijuana, stimulants, opiates) *and* used drugs in the past month. Following randomized-control-trial consent including information about time commitments, participants completed a computerized baseline assessment (and received a \$25 gift card), underwent breath alcohol analysis and a urine drug test (and received a \$10 gift card), and were randomized to condition. Before ED discharge, research assistants told brief motivational intervention/case management intervention participants that they were randomly assigned to attend "free" therapy sessions to review their survey information and/or available community options. Research assistants scheduled the intervention within 1 week. No financial incentive was given for attendance.

Descriptive characteristics

Among the 22,924 potentially eligible patients who presented during the recruitment period (see Figure 1), 80% ($n = 18,286$) were approached (some were missed because staff were busy with other patients) and 80% of the approached patients ($n = 14,557$) completed the screening survey: 1,938 (13.3%) were current alcohol or drug users *and* met the criteria for an SUD (6.8% alcohol only; 6.5% any drug). Almost 75% ($n = 1,441$) were enrolled in the randomized control trial (Table 1). There were no significant differences based on group assignment. Of these, 957 were randomized to brief motivational intervention/case management intervention and are the focus of subsequent analyses.

Measures

Measures included (a) demographics (Smith et al., 2006); (b) visit type (medical or injury); (c) physical and mental health functioning (Medical Outcome Study Short Form 12; Sherbourne et al., 1992; Ware, 1976); (d) readiness for change (12-item Readiness to Change Questionnaire; Heather et al., 1991, 1996; Rollnick et al., 1992); (e) self-efficacy (8-item Drug Taking Confidence Questionnaire; Annis and Graham, 1988; Sklar and Turner, 1999); and (f) alcohol/drug use and disorders from the Substance Abuse Outcomes Module (past-30-day number of drinking days; average consumption and frequency of heavy drinking; Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition [DSM-IV], diagnoses for alcohol- and drug-use disorders in the past year; Smith et al., 2006). Participants indicating current use and dependence symptoms only (i.e., tolerance/withdrawal) were included as SUD positive based on prior work "diagnostic orphans" (Harford et al., 2005; Pollock and Martin, 1999; Sarr et al., 2000).

Data analysis

Data were analyzed using SAS 9.0 (SAS Institute, Cary, NC). Initial bivariate analyses were conducted separately for brief motivational intervention and case management inter-

FIGURE 1. Study flowchart. Some patients had multiple emergency department (ED) visits and were screened more than once ($n = 2,168$). The first screen was used in data analysis. Multiple visits by individual patients are not reflected in the N of the overall sample frame. RA = research assistant; hrs. = hours.

^aExcluded: Tallied for 12 months of study and tripled to estimate 36 months of recruitment.

TABLE 1. Characteristics of participants in the randomized control trial randomly assigned to intervention groups

Variable	BMI <i>M (SD)</i> or %	CMI <i>M (SD)</i> or %	Total <i>M (SD)</i> or %
Demographics			
Age	33.5 (10.2)	32.8 (10.4)	33.2 (10.3)
Male	63%	62%	62%
African American	58%	59%	58%
Married or living together	26%	24%	25%
Some college or college graduate	27%	28%	27%
With health insurance	67%	65%	66%
Employed	38%	33%	36%
Health			
ED visit for injury	35%	35%	35%
SF-12 physical comp. $\leq$ 25th percentile	27%	23%	25%
SF-12 mental comp. $\leq$ 25th percentile	25%	25%	25%
Substance use			
Heavy drinking, past 30 days	62%	67%	65%
Cocaine use, past 30 days	22%	18%	20%
Marijuana use, past 30 days	61%	61%	61%
Alcohol-use disorder	41%	44%	42%
Drug-use disorder	47%	49%	48%
Substance-use related			
Substance-use treatment lifetime	40%	46%	43%
Readiness to change			
Precontemplation	18%	20%	19%
Contemplation	42%	47%	45%
Action	40%	34%	37%
Self-efficacy	52.4 (27.2)	49.2 (28.5)	50.8 (27.9)

Notes: BMI = brief motivational intervention; CMI = case management intervention; ED = emergency department; SF-12 = Medical Outcome Study Short Form 12; comp. = SF-12 component. None of these variables significantly varied by group assignment.

vention groups; however, because there were no differences in the characteristics of participants by condition, analyses focused on predictors of any intervention attendance (yes/no). *T* test was used for continuous variables (age, self-efficacy); chi-square was used for other categorical variables. Logistic regression analysis was conducted, using simultaneous forced entry, to examine predictors of intervention attendance (yes/no). There was no evidence of multicollinearity. Finally, it was not possible to examine intervention “completion” given differences in length of interventions (two in brief motivational intervention; five in case management intervention); furthermore, only 2.9% ($n = 14$) attended all five case management intervention sessions. Instead, predictors of intervention “engagement” were examined for those participants who attended at least two sessions.

Results

Overall, 50.2% of participants ($n = 480$) attended at least one session of the intervention. Bivariate analyses showed that participants who attended the intervention were older, not married, with health insurance, unemployed, less likely to report heavy drinking, and more likely to be in the action stage of change (Table 2). The logistic regression was significant— $\chi^2(17) = 60.44$, $p < .0001$, 64.7% concordant, 34.9% discordant—and had adequate model fit, Hosmer and

Lemeshow $\chi^2(8) = 6.23$, $p = .62$. Regarding intervention engagement, 109 (23.1%) attended two brief motivational intervention sessions, and 144 (29.7%) attended two case management intervention sessions. Bivariate analyses showed that intervention engagement was correlated with being older, not married, with health insurance, unemployed, poor physical health, and more likely to be in the action stage of change. The logistic regression was significant— $\chi^2(17) = 58.84$, $p < .0001$, 66.5% concordant, 33.0% discordant—and had adequate model fit, Hosmer and Lemeshow $\chi^2(8) = 5.90$, $p = .66$. Significant predictors included older age, male gender, not being married, having some college education, having health insurance, and being in the action stage of change (data not presented).

Discussion

Given health disparities in access to specialized treatment services based on race and socioeconomic status (Xu et al., 2007), the inner-city ED provides an important venue for identifying SUDs and facilitating linkage to substance-use services. Notably, the reason for the ED visit (injury vs. other medical complaint) was not a significant predictor of attendance, supporting broad SBIRT efforts in the ED. Our data show that 13% of inner city ED patients met DSM-IV criteria and report current use. In comparison, a

TABLE 2. Predictors of session attendance based on demographics, health status, and substance use–related factors

Variable	Attended <i>M (SD)/%</i>	Did not attend <i>M (SD)/%</i>	Logistic regression	
			OR	[CI]
Demographics				
Age*	35.0 (10.5)	31.3 (9.8)	1.03*	[1.02, 1.05]
Male	64%	60%	1.30	[0.97, 1.74]
African American	60%	57%	0.87	[0.65, 1.15]
Married or living together*	22%	28%	0.65*	[0.48, 0.88]
Some college or college graduate	30%	25%	1.32	[0.97, 1.78]
With health insurance*	70%	61%	1.41*	[1.06, 1.88]
Employed*	31%	40%	0.68*	[0.50, 0.91]
Health				
ED visit for injury	34%	37%	0.93	[0.70, 1.24]
SF-12 physical comp. ≤ 25th percentile	26%	24%	0.83	[0.60, 1.14]
SF-12 mental comp. ≤ 25th percentile	27%	23%	1.10	[0.80, 1.52]
Substance use				
Heavy drinking, past 30 days*	61%	68%	0.77	[0.57, 1.03]
Cocaine use, past 30 days	22%	17%	1.04	[0.73, 1.50]
Marijuana use, past 30 days	61%	61%	1.18	[0.88, 1.58]
Alcohol-use disorder ^a	40%	45%	—	—
Drug-use disorder ^a	50%	46%	—	—
Substance-use related				
Substance-use treatment, lifetime	46%	40%	0.96	[0.72, 1.28]
Readiness to change*				
Precontemplation	16%	21%	—	—
Contemplation	44%	46%	1.35	[0.92, 1.96]
Action	40%	33%	1.65*	[1.13, 2.41]
Self-efficacy	50.2 (28.5)	51.4 (27.3)	1.00	[0.99, 1.00]

Notes: Reference category for logistic regression = did not attend intervention; reference category for readiness to change = precontemplation. OR = odds ratio; CI = confidence interval; ED = emergency department; SF-12 = Medical Outcome Study Short Form 12; comp. = SF-12 component. ^aThese variables were not included in the regression because they were highly correlated with alcohol and drug use.

**p* < .05.

prior ED study reported that the rate of current SUD was 14.7% (Rockett et al., 2003), and nationally 7.5% meet the criteria for an SUD (Substance Abuse and Mental Health Services Administration, 2006). It is promising that half of the participants with SUDs attended a postdischarge intervention and that this rate did not differ based on substance(s) used. A prior study found that the rates of attendance to a post-ED intervention were 69% when an initial BI was conducted during the ED visit (Baird et al., 2007). Because of resource constraints, few EDs have incorporated BIs into clinical practice. Thus, offering a referral to a postdischarge intervention is a feasible method to address inner-city ED patients with SUDs. Additional studies are needed to determine the most effective SBIRT strategies (ED-based and/or post-ED visit) for SUD patients.

Consistent with theories and research on enabling factors, those without health insurance were less likely to attend an intervention. The uninsured are more likely to have both external (unavailability) and internal (lack of knowledge of available options) barriers to SUD treatment (Aday and Andersen, 1974; Andersen, 1995; Booth et al., 1998; Wells et al., 2001; Wu et al., 2003; Wu and Ringwalt, 2005). Findings also revealed that those who were younger, employed, and/or married were less likely to attend an intervention.

Focusing on these markers may provide an avenue to discuss barriers to accessing care, which may increase attendance to interventions post-ED visit. The only need factor to predict compliance with a post-ED intervention visit was readiness for change. Conceptually, readiness for change is important in BIs (Miller and Rollnick, 2002) and is related to alcohol use over time in ED studies (Neumann et al., 2006; Walton et al., 2007). Prior research shows that provider behaviors during an ED-based BI predict intervention attendance post-ED visit (Baird et al., 2007). Thus, some patients with SUDs (e.g., lower readiness to change) may benefit from ED-based BIs to increase compliance with intervention referrals.

Findings may not generalize to EDs in rural/suburban areas or to patients presenting on midnight shifts who may have different demographic or substance-use characteristics. Although attempts were made to recruit all ED patients, selection bias cannot be ruled out; thus, replication is required. It is possible that patients may have underreported their substance use/SUDs (Rockett et al., 2003). However, recent reviews have concluded that reliability/validity of self-reported alcohol and drug use is high (Brenner et al., 2003; Buchan et al., 2002; O'Farrell et al., 2003). It is unlikely that this potential underreporting affected the findings, given random assignment.

In conclusion, this study makes a novel contribution to the literature by examining inner-city ED patients with SUDs and by identifying predictors of attendance to a post-discharge intervention. The findings highlight the relative importance of attending to markers of barriers to care—such as insurance, employment, and readiness to change—in ED-based SBIRT protocols.

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References

- Aday, L. A., & Andersen, R. M. (1974). A framework for the study of access to medical care. *Health Services Research, 9*, 208-220.
- Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior, 36*, 1-10.
- Annis, H. M., & Graham, J. M. (Eds.) (1988). *Situational Confidence Questionnaire User's Guide*. Toronto, Canada: Addiction Research, Centre for Addiction and Mental Health.
- Babor, T. F., McRee, B. G., Kassebaum, P. A., Grimaldi, P. L., Ahmed, K., & Bray, J. (2007). Screening, brief intervention, and referral to treatment (SBIRT): Toward a public health approach to the management of substance abuse. *Substance Abuse, 28*, 7-30.
- Baird, J., Longabaugh, R., Lee, C. S., Nirenberg, T. D., Woolard, R., Mello, M. J., . . . Gogineni, A. (2007). Treatment completion in a brief motivational intervention in the emergency department: The effect of multiple interventions and therapists' behavior. *Alcoholism: Clinical and Experimental Research, 31* (10 Suppl.), 71s-75s.
- Baker, A., Lee, N. K., Claire, M., Lewin, T. J., Grant, T., Pohlman, S., . . . Carr, V. J. (2005). Brief cognitive behavioural interventions for regular amphetamine users: A step in the right direction. *Addiction, 100*, 367-378.
- Bernstein, E., & Bernstein, J. (2008). Effectiveness of alcohol screening and brief motivational intervention in the emergency department setting. *Annals of Emergency Medicine, 51*, 751-754.
- Bernstein, E., Bernstein, J., & Levenson, S. (1997). Project ASSERT: An ED-based intervention to increase access to primary care, preventive services, and the substance abuse treatment system. *Annals of Emergency Medicine, 30*, 181-189.
- Booth, B. M., Kirchner, J., Fortney, J., Ross, R., & Rost, K. (2000). Rural at-risk drinkers: Correlates and one-year use of alcoholism treatment services. *Journal of Studies on Alcohol, 61*, 267-277.
- Booth, R. E., Kwiatkowski, C., Iguchi, M. Y., Pinto, F., & John, D. (1998). Facilitating treatment entry among out-of-treatment injection drug users. *Public Health Reports, 113* (Suppl. No. 1), 116-128.
- Brener, N. D., Billy, J. O., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health, 33*, 436-457.
- Buchan, B. J., Dennis, M. L., Tims, F. M., & Diamond, G. S. (2002). Cannabis use: Consistency and validity of self-report, on-site urine testing and laboratory testing. *Addiction, 97* (Suppl. No. 1), 98-108.
- Cherpitel, C. J., & Bazargan, S. (2003). Screening for alcohol problems: Comparison of the AUDIT, RAPS4 and RAPS4-QF among African American and Hispanic patients in an inner city emergency department. *Drug and Alcohol Dependence, 71*, 275-280.
- Cunningham, R., Walton, M. A., Maio, R. F., Blow, F. C., Weber, J. E., & Mirel, L. (2003). Violence and substance use among an injured emergency department population. *Academic Emergency Medicine, 10*, 764-775.
- Dunn, C. W., & Ries, R. (1997). Linking substance abuse services with general medical care: Integrated, brief interventions with hospitalized patients. *American Journal of Drug and Alcohol Abuse, 23*, 1-13.
- Fuda, K. K., & Immekus, R. (2006). Frequent users of Massachusetts emergency departments: A statewide analysis. *Annals of Emergency Medicine, 48*, 9-16.
- Harford, T. C., Grant, B. F., Yi, H. Y., & Chen, C. M. (2005). Patterns of DSM-IV alcohol abuse and dependence criteria among adolescents and adults: Results from the 2001 National Household Survey on Drug Abuse. *Alcoholism: Clinical and Experimental Research, 29*, 810-828.
- Havard, A., Shakeshaft, A., & Sanson-Fisher, R. (2008). Systematic review and meta-analyses of strategies targeting alcohol problems in emergency departments: Interventions reduce alcohol-related injuries. *Addiction, 103*, 368-376; discussion 377-368.
- Heather, N., Gold, R., & Rollnick, S. (1991). *Readiness to Change Questionnaire: User's Manual*. (Technical Report 15). Kensington, Australia: National Drug and Alcohol Research Centre, University of New South Wales.
- Heather, N., Rollnick, S., Bell, A., & Richmond, R. (1996). Effects of brief counselling among male heavy drinkers identified on general hospital wards. *Drug and Alcohol Review, 15*, 29-38.
- Hser, Y. I., Maglione, M., Polinsky, M. L., & Anglin, M. D. (1998). Predicting drug treatment entry among treatment-seeking individuals. *Journal of Substance Abuse Treatment, 15*, 213-220.
- Joe, G. W., Simpson, D. D., & Broome, K. M. (1998). Effects of readiness for drug abuse treatment on client retention and assessment of process. *Addiction, 93*, 1177-1190.
- Lang, E., Engeland, M., & Brooke, T. (2000). Report of an integrated brief intervention with self-defined problem cannabis users. *Journal of Substance Abuse Treatment, 19*, 111-116.
- Longabaugh, R., Woolard, R. E., Nirenberg, T. D., Minugh, A. P., Becker, B., Clifford, P. R., . . . Gogineni, A. (2001). Evaluating the effects of a brief motivational intervention for injured drinkers in the emergency department. *Journal of Studies on Alcohol, 62*, 806-816.
- Marijuana Treatment Project Research Group. (2004). Brief treatments for cannabis dependence: Findings from a randomized multisite trial. *Journal of Consulting and Clinical Psychology, 72*, 455-466.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people to change addictive behavior* (2nd ed.). New York: Guilford Press.
- Neumann, T., Neuner, B., Weiss-Gerlach, E., Tonnesen, H., Gentilello, L. M., Wernecke, K. D., . . . Spies, C. D. (2006). The effect of computerized tailored brief advice on at-risk drinking in subcritically injured trauma patients. *Journal of Trauma, 61*, 805-814.
- Nilsen, P., Baird, J., Mello, M. J., Nirenberg, T., Woolard, R., Bendtsen, P., & Longabaugh, R. (2008). A systematic review of emergency care brief alcohol interventions for injury patients. *Journal of Substance Abuse Treatment, 35*, 184-201.
- O'Farrell, T. J., Fals-Stewart, W., & Murphy, M. (2003). Concurrent validity of a brief self-report drug use frequency measure. *Addictive Behaviors, 28*, 327-337.
- Pollock, N. K., & Martin, C. S. (1999). Diagnostic orphans: Adolescents with alcohol symptom who do not qualify for DSM-IV abuse or dependence diagnoses. *American Journal of Psychiatry, 156*, 897-901.
- Rockett, I. R., Putnam, S. L., Jia, H., & Smith, G. S. (2003). Assessing substance abuse treatment need: A statewide hospital emergency department study. *Annals of Emergency Medicine, 41*, 802-813.
- Rollnick, S., Heather, N., Gold, R., & Hall, W. (1992). Development of a short 'readiness to change' questionnaire for use in brief, opportunistic interventions among excessive drinkers. *British Journal of Addiction, 87*, 743-754.

- Sarr, M., Bucholz, K. K., & Phelps, D. L. (2000). Using cluster analysis of alcohol use disorders to investigate 'diagnostic orphans': Subjects with alcohol dependence symptoms but no diagnosis. *Drug and Alcohol Dependence, 60*, 295-302.
- Sherbourne, C. D., Hays, R. D., Ordway, L., DiMatteo, M. R., & Kravitz, R. L. (1992). Antecedents of adherence to medical recommendations: Results from the Medical Outcomes Study. *Journal of Behavioral Medicine, 15*, 447-468.
- Sklar, S. M., & Turner, N. E. (1999). A brief measure for the assessment of coping self-efficacy among alcohol and other drug users. *Addiction, 94*, 723-729.
- Smith, G. R., Burnam, M. A., Mosley, C. L., Hollenberg, J. A., Mancino, M., & Grimes, W. (2006). Reliability and validity of the substance abuse outcomes module. *Psychiatric Services, 57*, 1452-1460.
- Stotts, A. L., Schmitz, J. M., Rhoades, H. M., & Grabowski, J. (2001). Motivational interviewing with cocaine-dependent patients: A pilot study. *Journal of Consulting and Clinical Psychology, 69*, 858-862.
- Substance Abuse and Mental Health Services Administration (Office of Applied Studies). (2006). *Results from the 2005 National Survey on Drug Use and Health: National Findings* (NSDUH Series H-30, DHHS Publication No. SMA 06-4194), Rockville, MD: Author.
- Walton, M. A., Cunningham, R. M., Chermack, S. T., Maio, R., Blow, F. C., & Weber, J. (2007). Correlates of violence history among injured patients in an urban emergency department: Gender, substance use, and depression. *Journal of Addictive Diseases, 26*, 61-75.
- Ware, J. E. Jr. (1976). Scales for measuring general health perceptions. *Health Services Research, 11*, 396-415.
- Weaver, M. F., Jarvis, M. A., & Schnoll, S. H. (1999). Role of the primary care physician in problems of substance abuse. *Archives of Internal Medicine, 159*, 913-924.
- Weisner, C. (1993). Toward an alcohol treatment entry model: A comparison of problem drinkers in the general population and in treatment. *Alcoholism: Clinical and Experimental Research, 17*, 746-752.
- Wells, K., Klap, R., Koike, A., & Sherbourne, C. (2001). Ethnic disparities in unmet need for alcoholism, drug abuse, and mental health care. *American Journal of Psychiatry, 158*, 2027-2032.
- Wu, L. T., Kouzis, A. C., & Schlenger, W. E. (2003). Substance use, dependence, and service utilization among the US uninsured nonelderly population. *American Journal of Public Health, 93*, 2079-2085.
- Wu, L. T., & Ringwalt, C. (2005). Use of substance abuse services by young uninsured American adults. *Psychiatric Services, 56*, 946-953.
- Xu, J., Wang, J., Rapp, R. C., & Carlson, R. G. (2007). The multidimensional structure of internal barriers to substance abuse treatment and its invariance across gender, ethnicity, and age. *Journal of Drug Issues, 37*, 321-340.