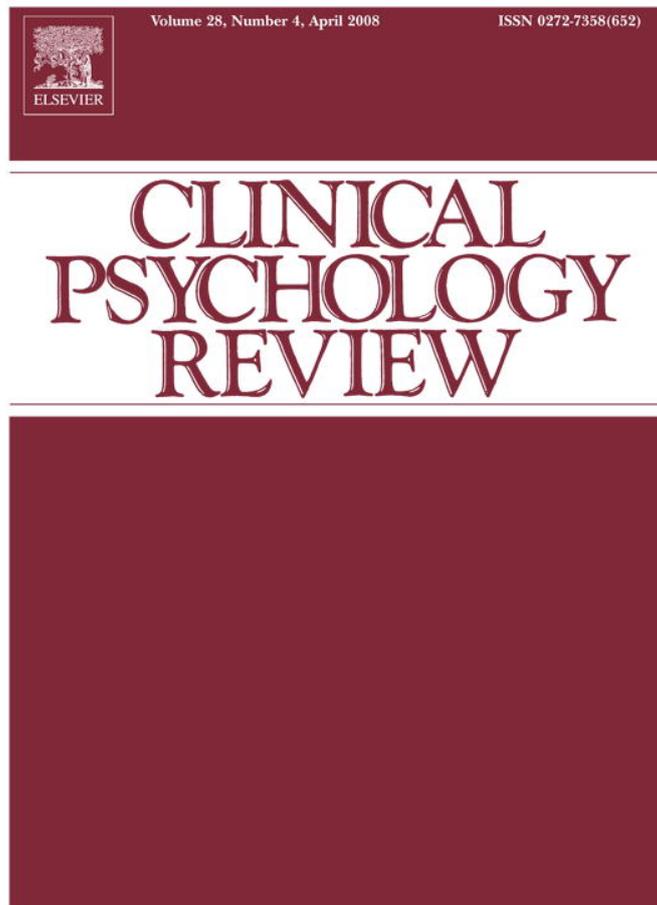


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Screening psychiatric patients for illicit drug use disorders and problems[☆]

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Abstract

Background: Illicit drug use is prevalent but under-detected among psychiatric patients. This paper reviews the need for a valid, practical screening instrument for detecting drug problems and disorders among psychiatric patients, and describes the appropriateness of existing screening instruments for this purpose.

Methods: Research literature on illicit drug screening instruments is reviewed.

Results: All existing instruments lack one or more of the following characteristics that would enable them to be used routinely in psychiatric settings: brief and easy to administer, demonstrated validity for male and female psychiatric patients, measuring illicit drug use problems without confounding with alcohol use problems, and assessing drug problems over an optimal timeframe for screening (e.g., past 12 months).

Conclusion: Current instruments are not appropriate for routine drug screening of psychiatric patients. A brief, easy to use drug screen should be developed and validated on male and female psychiatric patients for routine screening of drug disorders and problems.

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1. Introduction

Illicit drug use and drug use disorders (DUDs) are prevalent among individuals with psychiatric disorders in representative community samples (e.g., Kessler et al., 1994). A much higher prevalence of comorbid drug use disorders, from approximately 20% to 70%, has been documented in clinical studies of patients in mental health settings (e.g., Ananth et al., 1989; Bastiaens, Riccardi, & Sakhrani, 2002; Drake & Wallach, 1989; Rosenberg et al., 1998; Wolford et al., 1999). Although studies using structured diagnostic procedures have identified a high prevalence of DUDs, the comorbid drug use disorders and problems of many psychiatric patients go undetected due to the absence of screening with a practical, valid instrument (Berman, Bergman, Palmstierna, & Schlyter, 2005; Blow, McCarthy, Valenstein, Austin, & Gillon, 2005). Current practice guidelines recommend screening for DUDs, with the goal of referring patients who screen positive to substance use disorder (SUD) specialty treatment (Center for Substance Abuse Treatment, 2005b; Sullivan & Fleming, 1997; Veterans Health Administration, 2005).

In this paper, we describe the rationale for routine screening of drug use disorders and problems among psychiatric patients, and highlight the most important criteria for a practical and clinically useful screening instrument for drug use disorders and problems. We then review 15 existing screening instruments and their adequacy for this purpose, and provide suggestions for future research.

1.1. Rationale for routine screening of drug disorders/problems among psychiatric patients

Routine screening of drug disorders/problems among psychiatric patients is needed because DUDs are under-identified in such patients, drug use is associated with poorer outcomes and higher health care costs among psychiatric patients and identifying and treating drug disorders/problems is associated with better patient outcomes and reduced health care costs.

1.2. Drug use disorders are under-identified and under-treated

Early detection of drug use disorders and problems provides an opportunity to intervene when drug use is less severe and prognosis is more positive; unfortunately, drug-related disorders are under-detected and under-treated in many mental health systems (e.g., Ananth et al., 1989; Blow et al., 2005; Drake et al., 1990; Rosenheck, 2004; Shaner et al., 1993). For example, Ananth et al. (1989) compared DUDs detected by a research team using the DIS, psychiatric emergency room staff, and staff at a state hospital for the same episode of care. The research team diagnosed 175 drug use disorders, whereas the state hospital staff diagnosed only 23 and emergency staff detected only 4 DUDs (Ananth et al., 1989). Similarly, Shaner et al. (1993) found that 36% of schizophrenic patients admitted to a VA psychiatric unit had positive urine tests for cocaine, but clinicians failed to recognize cocaine use in one-third of those patients.

DUDs and problems in women patients with psychiatric disorders may be treated even less often than those in men because of the disparity that exists between male and female patients in SUD treatment utilization. Although women in general seek help more readily than men for physical or mental health conditions, they are less likely to seek help for drug or alcohol (substance use) problems, due to such systemic barriers as lack of services tailored to women patients (Beckman & Amaro, 1986). In addition, there is greater stigma attached to substance use by women, and, as a result, women seek treatment later than men in the course of their substance use disorders and at a point when their problems are more severe (Beckman and Amaro, 1986; Marsh, Colten, & Tucker, 1982). For these reasons, the extent of under-detection and under-treatment of drug-related problems in female patients may be greater than for male patients. Accordingly, a drug screen that is validated for female patients may be an even more pressing need than a screener for male patients.

1.3. Drug use is associated with poorer psychiatric patient outcomes and higher healthcare costs

Illicit drug use can have dire consequences, especially among individuals with psychiatric disorders. It is well-documented that comorbid mental illnesses and SUDs are associated with multiple problems, including having more severe psychiatric symptoms (Barry, Fleming, Greenley, Kropp, & Widlak, 1996; Bartels et al., 1993; Drake & Wallach, 1989; Linszen, Dingemans, & Lenior, 1994; Owen et al., 1996; Tiet, Finney, & Moos, 2006; Tiet, Ilgen, Byrnes, Moos, 2006), heightened risk for HIV infection, poorer psychosocial adjustment, and unstable housing and homelessness (Barry et al., 1996; Caton et al., 1994; Drake & Wallach, 1989; Saunders and Robinson, 2002), and medication non-compliance and interactions between prescribed medications and illicit drugs (e.g., Colpaert, Niemegeers, & Janssen, 1987; Owen, Fischer, Booth, & Cuffel, 1996). For example, postsynaptic dopamine receptors of chronic cocaine users, even when detoxified, are depleted; thus, cocaine use may reduce the efficacy of neuroleptics (Volkow et al., 1990). Drug use often precedes homelessness (Caton et al., 1994) and is a key factor in housing crises and returns to homelessness for people with severe mental illness (Center for Mental Health Services, 1994).

Finally, studies have consistently found significantly higher service utilization, increased rates of institutionalization (e.g., psychiatric hospitalization, jail) and use of emergency services (Bartels et al., 1993; Carey, 1995), and greater psychiatric expenditures for patients with comorbid psychiatric disorders and SUDs (Dickey & Azeni, 1996; Garnick, Hendricks, Drainoni, Horgan, & Comstock, 1996). Individuals with major mental illness and comorbid SUD have a greater probability of being hospitalized for psychiatric disorders, a higher probability of a longer stay when admitted, and larger health care expenditures than those without SUDs (Dickey and Azeni, 1996).

1.4. Treating drug problems leads to better outcomes and reduces health care costs

Treatment of drug-related problems among patients with psychiatric disorders is associated with better drug-related outcomes (e.g., Barrowclough et al., 2001; Hien, Cohen, Miele, Litt, & Capstick, 2004; Milby et al., 2000; Petrakis et al., 2004; Tiet, Ilgen, Byrnes, Harris, & Finney (2007), for a review, see Tiet and Mausbach, 2007). Furthermore, treatment of drug-related problems or integrated treatment for both drug-related and psychiatric problems for dual diagnosis patients also is associated with better psychiatric and psychosocial outcomes (e.g., Barrowclough et al., 2001; Drake et al., 1998; Hien et al., 2004; Schmitz et al., 2002). Thus, effective treatments are available to treat patients with both psychiatric and DUDs, if drug-related disorders and problems are detected.

There also is evidence of cost offsets with respect to reduced health care utilization and savings to health care systems for treating comorbid SUDs (Center for Substance Abuse Treatment, 2005a). For example, Bartels et al. (1993) showed that patients who had a history of drug abuse/dependence, but no current use, used fewer institutional (hospitalization and jail) and emergency services, and had lower health care costs, than current drug abusers. Therefore, early identification and treatment of drug problems can prevent increased use of more intensive, sustained, and expensive health care services.

1.5. Toward a practical illicit drug screening instrument for psychiatric patients

A useful drug screen needs to be brief, focus on current drug disorders and problems, and have been validated for drug disorders and drug-related problems with male and female psychiatric patients. Research on alcohol screeners shows that brevity is essential if clinicians are to adopt the instrument for routine use. Bradley et al (2004) noted that the ten-item Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) was too long for routine use in health care systems and, therefore, the four-item CAGE (Ewing, 1984) was much more widely used than the AUDIT, even though the psychometric properties of the AUDIT were better than that of the CAGE as a screener for alcohol use and problems (Bradley et al., 2004). Once a brief version of the AUDIT (the AUDIT-C; 3 items) was developed, it has been more widely used and has been mandated as an alcohol misuse screen in primary care settings by the VA (Knott et al., 2006; Veterans Health Administration, 2004). This history suggests that a drug screen for routine use in the psychiatric settings needs to be brief.

Many existing screeners assess drug use and related behaviors in an inappropriate time frame (e.g., lifetime) for clinical use. To assist clinicians in psychiatric settings, an instrument focusing on recent drug use and related behaviors is required. For example, if a 45-year-old patient used marijuana during his early twenties and has not used any illicit drugs since then, identifying his drug use 20 years earlier has no clinical utility. We believe that a screener that focuses

Table 1
Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy rate

Test result	Gold Standard		Total
	+	–	
+	a =true positive	b =false positive	$a+b$
–	c =false negative	d =true negative	$c+d$
Total	$a+c$	$b+d$	

Sensitivity= $a/(a+c)$.

Specificity= $d/(b+d)$.

Positive Predictive Value (PPV)= $a/(a+b)$.

Negative Predictive Value (NPV)= $d/(c+d)$.

Accuracy rate= $(a+d)/(a+b+c+d)$.

on drug-related behaviors in the past 12 months is more appropriate than one inquiring about drug-related behaviors in the past 3 months. A 12-month window is consistent with the DSM-IV criteria (American Psychiatric Association, 1994). Furthermore, since intermittent periods of remission are common in the course of drug use and drug use disorders, a shorter window of 3 months may miss drug use and related behaviors that would be important in determining appropriate care for those patients.

Drug screening instruments need to be validated for both male and female psychiatric patients. The psychometric properties (e.g., sensitivity, specificity) and the cut-point on a screening instrument to optimally differentiate between group membership (e.g., caseness vs. control) on DUD or drug problems depend not only on the instrument, but also on the characteristics of the target population in terms of the gender distribution and the prevalence of the target condition (e.g., Maisto, Carey, Carey, Gordon, & Gleason, 2000; Wolford et al., 1999). Maisto et al. (2000) underscore that drug screen instruments, such as the DAST-10, may show differential performance in men and women. They recommend that instruments be validated, and cut points be identified, separately for men and women.

Sensitivity is the true positive rate, or the rate of “caseness” that is detected by an instrument among the patients who actually have the target condition. An instrument that has a low sensitivity rate will miss many patients who have the disorder and need further assessments or treatment. Specificity is the true negative rate, or the rate that patients are screened as negative among patients who truly do not have the disorder. An instrument that has a low specificity rate will cause clinicians to conduct unnecessary further assessment and management or referral; in turn, this will incur unnecessary costs to the healthcare system. Ideally clinicians and policy makers would prefer to select screening instruments that have both sensitivity and specificity of greater than .80. Positive predictive value (PPV) is the rate that a positive test is a true positive among people who are administered the test, and negative predictive value (NPV) is the rate that a negative test is a true negative among people who are administered the test. PPV and NPV are important indices for interpreting the meaning of a test result; however, PPV and NPV rates change when the base rate of the disorder changes in a population. Table 1 summarizes the calculations of sensitivity, specificity, PPV, NPV, and accuracy rate.

It is important to screen for drug-related consequences, as well as drug use disorders for several reasons. First, DUDs are defined in terms of *persistent pattern* of maladaptive drug use or *recurrent* drug use resulting in negative consequences (American Psychiatric Association, 1994). A drug screen that is sensitive to drug-related consequences that are not necessarily persistent or are milder than the DSM-IV criteria could identify individuals for early intervention to prevent more severe drug use. For example, consequences, such as those measured by the Inventory of Drug Use Consequences (InDUC; Tonigan & Miller, 2002), may include “feeling bad,” “being unhappy,” or “people have worried” about an individual’s drug use before drug use has led to persistent impairment. Second, screening for drug-related consequences is more inclusive than screening only for DUDs. Thus, people who meet the diagnostic criteria for a DUD also will be screened as positive for drug-related consequences, and can be further assessed, as necessary. Third, clinicians need a measure that is sensitive to problems and consequences of drug use, rather than merely DUDs, because information at this level is useful for treatment planning and patient management (Carey, Roberts, Kivlahan, Carey, & Neal, 2004). Similarly, a measure that merely measures quantity and frequency of drug use is inadequate because the same quantity and frequency of drug use may be associated with different levels of consequences and problems due to individual differences (Tonigan & Miller, 2002). Therefore, clinicians need a screening measure that is sensitive to problems and consequences of drug use, in addition to detecting drug use disorders.

Table 2
Summary of characteristics of screeners of drug or substance use disorders

Measure	Time frame	Direct, indirect, and subtle questions	Screen for drugs versus for drugs and other substances	Number of questions (time to administer)
1. Addiction Potential Scale (APS; Weed et al., 1992)	Unspecified	Subtle	Alcohol and drugs	39 questions
2. Addiction Acknowledgment Scale (AAS; Weed et al., 1992)	Unspecified	Direct, indirect, and subtle	Alcohol and drugs	13 questions
3. CAGE-Adapted to Include Drugs (CAGE-AID; Brown & Rounds, 1995)	Lifetime	Indirect	Alcohol and drugs	4 questions
4. Short Michigan Alcoholism Screening Test-Adapted to Include Drugs (SMAST-AID; Brown & Rounds, 1995)	Lifetime	Indirect	Alcohol and drugs	13 questions
5. Substance Abuse Subtle Screening Inventory-3 (SASSI-3; Miller & Lazowski, 1999)	Lifetime	Direct/indirect and subtle	Alcohol and drugs	93 questions
6. Drug Abuse Scale (or "T Scale") (DAS; Millon 1982)	Lifetime	5 Direct/indirect and 41 subtle	Drugs	46 questions
7. Kreek–McHugh–Schluger–Kellogg (KMSK; Kellogg et al., 2003)	Lifetime	Direct	Alcohol and drugs (cocaine and opiates)	6–8 questions per substance
8. Dartmouth Assessment of Lifestyle Instrument (DALI; Rosenberg et al., 1998)	Lifetime and current (6 months)	Direct and indirect	Alcohol and drugs (cannabis, and cocaine)	18 questions (6 min)
9. Alcohol, Smoking and Substance Involvement Screening Test (ASSIST; WHO, 2002)	Lifetime and current (3 months)	Direct and indirect	Tobacco, alcohol and drugs	10–71 questions (5 min)
10. Reasons for Drug Use Screening Test (RDU; Grant et al., 1988)	Current (unspecified)	Indirect	Drugs	31 questions
11. Drug Use Screening Inventory (DUSI; Tarter & Hegedus, 1991)	Current (1 and 12 months)	Direct and indirect	Alcohol and drugs	149 questions (20 min)
12. Two-item Conjoint Screening (TICS; Brown et al., 1997)	Current (12 months)	Indirect	Alcohol and drugs (cannabis and cocaine)	2 questions
13. Rapid Drug Problems Screen (RDPS; Cherpitel & Borges, 2004)	Current (12 months)	Indirect	Drugs	4 questions
14. Drug Use Disorders Identification Test (DUDIT; Berman et al., 2005)	Current (12 months)	Direct and indirect	Drugs	11 questions
15. Drug Abuse Screening Test (DAST; Skinner, 1982)	Current (12 months)	Direct and indirect	Drugs	28-, 20-, and 10-item versions

In summary, early detection and treatment of psychiatric patients' drug use disorders and problems are associated with better psychiatric and drug-related outcomes and reduction in health care costs (e.g., Clark et al., 1998; Center for Substance Abuse Treatment, 2005b). Current guidelines recommend screening for drug use disorders and referral of identified patients to specialty SUD treatment (Center for Substance Abuse Treatment, 2005b; Sullivan & Fleming, 1997; Veterans Health Administration, 2005). However, a specific instrument for this purpose has not been recommended by any guideline. We next review existing instruments in an attempt to determine if an appropriate instrument exists for this purpose.

2. Methods

We surveyed MEDLINE and PsychInfo for screening instruments, published between 1980 and 2006, for illicit drug use disorders and problems. In an effort to locate articles not found in our keyword search, reference sections of published articles also were examined. We included instruments that screen for illicit drug use disorders/problems, as well as for conjoint drug and alcohol disorders/problems and attempted to include all screening instruments that have been published in English. We excluded instruments developed specifically for adolescents, such as the Problem Oriented Screening Instrument for Teenagers (POSIT; Latimer, Winters, & Stinchfield, 1997) or RAFFT (Riggs & Alario, 1987), because our goal was to review screening instruments for general adult psychiatric populations.

3. Results

Fifteen screening instruments for illicit drugs or conjoint alcohol and illicit drugs were identified. Table 2 summarizes the timeframe (e.g., lifetime), use of direct, indirect, or subtle questions for the assessment of substance use, substances assessed (drugs

Table 3
Summary of validity studies on screeners of drug or substance use disorders

Measure	Study	Validated with psychiatric sample	Validated for men and women	Instrument or method of drug or substance use disorder validation	Sensitivity and specificity	Positive and negative predictive value	Accuracy rate
1. APS	Rouse et al., 1999	Yes	No	Clinician report of “abuse”	.64 and .66	.23 and .88	
	Stein et al., 1999	Yes	Men	Clinician rating of “abuse”	.48 and .91		
2. AAS	Rouse et al., 1999	Yes	Women	Clinical report of “abuse”	.46 and .91	.40 and .96	
	Stein et al., 1999	Yes	Men	Clinician rating of “abuse”	.79 and .79		
3. CAGE–AID	Brown & Rounds, 1995	No	Women Together	DIS-R	.85 and .87		
			Men		.70 and .85		
4. SMAST–AID	Brown & Rounds, 1995	No	Women	DIS-R	.88		
			Men		.72		
5. SSASI-3	Lazowski et al., 1998	No	No	Clinician report	.40 and .95	.99 and .90	
	Feldstein & Miller, 2006	Vary	Vary	Vary (review paper)	.97 and .95		
6. DAS	Calsyn et al., 1990	No	Men	Case-control study	.70 and .62		
	Calsyn et al., 1991	No	Men	Drug treatment sample	.39 and .88		
	Bryer et al., 1990	Yes	No	Chart review	.49	.36	.79
7. KMSK	Kellogg et al., 2003	No	No	SCID	.49		
8. DALI	Rosenberg et al., 1998	Yes	No	SCID	.90–1.0 and .90–.99	.56 and 1.0	.90
9. ASSIST	Newcombe et al., 2005	No	No	MINI Plus	1.0 and .80		
10. RDU	Rosenberg et al., 1998	Yes	No	SCID	.58–1.0 and .64–.91	.47 and .92	.77
11. DUSI	Tarter & Kirisci, 1997	No	No	SCID	.73 and .79		.72
12. TICS	Brown et al., 1997	No	No	CIDI	.80 and 1.0	.69 and .93	
13. RDPS	Cherpitel & Borges, 2004	No	Men	CIDI	.81 and .91		
14. DUDIT	Berman et al., 2005	No	Women	SCAN	.91 and .96		
	Rosenberg et al., 1998	Yes	No		.90 and .78		
15. DAST	Wolford et al., 1999	Yes	No	SCID	.67 and .68	.35 and .89	.70
	Maisto et al., 2000	Yes	No	SCID and CRS	.72 and .77	.46 and .91	.74
		Yes	No	SCID	.85 and .78	.35 and .97	.79

or drugs and other substances), number of questions, and estimated time required to administer the instrument (if available). Direct questions assess quantity, frequency, and consequences of substance use, such as “How often have you used drugs in the past 12 months?” Indirect questions assess behavior, feelings, thoughts, and other people’s reaction to the respondent’s substance use, such as, “Have you felt you wanted to cut down your drug use?” Subtle questions assess domains related to substance use, such as impulsivity, legal problems, and life styles. For example, “I have never been in trouble with the law.”

Table 3 provides information about whether validation was conducted with a psychiatric sample and whether it was conducted separately for men and women, the criterion used to ascertain a substance use disorder, and psychometric properties of the screening instruments. Table 3 also includes sensitivity (true positive rate), specificity (true negative rate), positive predictive value (PPV; likelihood that a positive test is a true positive), negative predictive value (NPV; likelihood that a negative test is a true negative), accuracy rate (total percent identified accurately), and the area under the receiver operating characteristic (ROC) curve (AUC) of the instruments, when such data were available. AUC is a summary measure of accuracy using sensitivity and specificity of an instrument.

The Addiction Potential Scale (APS) and the Addiction Acknowledgment Scale (AAS) were developed for the MMPI-2 (Weed, Butcher, McKenna, & Ben-Porath, 1992) and focus primarily on measuring alcohol-related problems. The APS is an empirically-constructed 39-item scale designed to identify personality characteristics and lifestyle patterns associated with substance abuse, but it does not directly assess substance use. In contrast, the 13-item AAS was constructed specifically with the attention to internal consistency and face validity, so the items focus more directly on substance use. Validation data were obtained on a sample of 68 substance-abusing and 392 non-abusing psychotherapy clients (as reported by their therapists). The APS had sensitivity=.64; specificity=.66, PPV=.23, and NPV=.88; the AAS had sensitivity=.79, specificity=.79, PPV=.40, and NPV=.96 (Rouse, Butcher, and Miller; 1999). The scales also were validated against intake workers' ratings of lifetime substance use in a sample of 833 outpatients at a community mental health center. The APS had sensitivity=.46 and specificity=.91 for women and sensitivity=.48 and specificity=.91 for men; the AAS had sensitivity=.85 and specificity=.87 for women and sensitivity=.71 and specificity=.91 for men (Stein, Graham, Ben-Porath, & McNulty, 1999).

The CAGE (the abbreviations for feeling the need to Cut-down substance use, feeling Annoyed by criticism of substance use, feeling Guilty about substance use, and using substance as an Eye-opener; Ewing, 1984) has been adapted to include drugs (AID), as a conjoint measure (CAGE–AID) for both alcohol and drugs (Brown & Rounds, 1995). The CAGE–AID contains the original items used in the CAGE, but in a modified form. For example, one of the CAGE items was modified to read: "Have you ever felt bad or guilty about your drinking *or drug use*?" Using data from 124 patients in a community family practice clinic, the measures were examined against the Diagnostic Interview Schedule-Revised (DIS-R) DUD diagnoses. Slightly over half (51%) of the participants had at least one lifetime substance abuse or dependence diagnosis, with 27% having only alcohol-related diagnoses, 19% having alcohol-related diagnoses and one or more other drug-related diagnoses, and 6% having only one or more drug-related diagnoses other than alcohol. The CAGE–AID was more sensitive (.70) but less specific (.85) than the CAGE (.64 and .93, respectively) for substance abuse (Brown & Rounds, 1995).

As was done with the CAGE, the Short Michigan Alcoholism Screening Test (SMAST; Selzer, Vinokur, & van Rooijen, 1975) has been adapted as a conjoint measure (SMAST–AID) for both alcohol and drugs (Brown & Rounds, 1995). Brown and Rounds (1995) validated the CAGE–AID and SMAST–AID in the same study (see above) and found that the SMAST–AID was not sensitive (.40), but very specific (.95). The MAST has been criticized because many of its items are irrelevant or confusing for people with severe mental illness (Searles, Alterman, & Purtill, 1990).

The Substance Abuse Subtle Screening Inventory (SASSI) was designed to identify individuals who have a high probability of a lifetime substance use diagnosis. The third version of the instrument (SASSI-3; Miller & Lazowski, 1999) consists of 93 direct, indirect and subtle questions. Validation data were obtained on a sample of 381 patients with a lifetime dependence disorder from addiction treatment centers, general psychiatric hospitals, a dual diagnosis hospital, a vocational rehabilitation program, and a sex-offender treatment program. The SASSI-3 was validated against clinical diagnoses of a lifetime substance dependence disorder (procedures not reported), and achieved sensitivity=.97, specificity=.95, PPV=.99, and NPV=.90 in this sample (Lazowski, Miller, Boye, & Miller, 1998). However, in a review based on studies with a total $N=22,110$ by Feldstein & Miller (2006), the psychometric properties of the SASSI were found to be less adequate: average sensitivity=69.8%, specificity=62%, and false positives=56% (with studies weighted by N).

The Drug Abuse Scale (DAS or the T Scale) of the Millon Clinical Multiaxial Inventory-III (MCMI-III; Millon, 1983) measures recurrent or recent history of drug abuse and personality characteristics associated with substance use, such as lack of impulse control and inability to manage consequences of impulsive behaviors. The validity of the scale has been questioned because only a few items specifically address drug-related issues (Marsh, Stile, Stoughton, & Trout-Landen, 1988), and, in fact, it has correctly classified less than 50% of the participants in a number of studies (Bryer, Martines, & Dignam, 1990; Calsyn, Saxon, & Daisy, 1990, 1991). For example, the DAS had a sensitivity=.39 and specificity=.88 on a sample of 75 men entering SUD treatment and 60 men in the control condition who were in psychiatric treatment and had no drug problems (Calsyn et al., 1990). Calsyn et al. (1991) found that the DAS identified only 49% of 110 male drug abusers who were admitted into SUD treatment. The DAS had a sensitivity=.49, PPV=.36 and accuracy rate=.79 on 561 psychiatric inpatients (408 women and 153 men) compared to diagnoses made by the participants' psychiatrists at discharge in a study by Bryer et al. (1990).

The Kreek–McHugh–Schluger–Kellogg (KMSK) Scale was designed to quantify the frequency, amount, and duration of use of opiates, cocaine, alcohol, and tobacco (Kellogg et al., 2003). Participants ($N=226$) were recruited through print advertisements, radio announcements, and outpatient treatment programs, but 126 individuals were excluded due to missing data. The KMSK was compared to the Structured Clinical Interview for DSM-IV (SCID-I; First, Gibbon, Spitzer, & William, 1996); 46 of 100 participants

met lifetime diagnostic criteria for an alcohol, opiate, and/or cocaine dependence. The sensitivity for alcohol, opiate, and/or cocaine dependence ranged from .90 to 1.0 and specificity ranged from .90 to .99 (Kellogg et al., 2003).

The Dartmouth Assessment of Lifestyle Instrument (DALI) focuses on detecting substance use disorders in people with severe mental illness, and includes an alcohol and a drug screen (Rosenberg et al., 1998). The items were selected from ten instruments, and the scale was validated against the Structured Clinical Interview for DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1988) and the Clinician Rating Scale (Drake et al., 1990) in a sample of 73 patients, 34 of whom had a cannabis- and/or cocaine-related disorder. The DALI drug screen, which takes about 6 min to administer (Rosenberg et al., 1998), had a sensitivity=1.0, specificity=.80, PPV=.56, and NPV=1.0, accuracy rate=89.7%, and AUC=.93 for cannabis and cocaine disorders.

The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST; World Health Organization ASSIST Working Group, 2002) was developed to detect tobacco, alcohol, and drug use, and related problems for patients in primary care settings. The ASSIST assesses use of individual drugs (e.g., cannabis, cocaine) to provide patients with specific information about risks due to each specific substance they use. The ASSIST (Version 2.0) includes eight sets of questions, with built-in skips patterns: seven sets of 10 questions (for each of 10 substances, including tobacco, alcohol, seven categories of illicit drug and one category of “other drugs”), and one question about injection of any substance (Newcombe, Humeniuk, & Ali, 2005). A validation sample at an Australian site consisted of 50 participants from drug treatment settings and 100 participants from primary care settings. Based on diagnostic assessments with the MINI International Neuropsychiatric Interview (MINI Plus; Sheehan et al., 1998), 79% of this sample had an alcohol disorder (abuse or dependence), 53% had a cannabis disorder, 35% had an amphetamine-type stimulants disorder, 15% had a sedatives disorder, and 24% had an opiates disorder. The ASSIST discriminated more effectively between non-problematic drug use and abuse (AUC of between .87 and 1.00) than between abuse and dependence (AUC of between .56 and .86), and achieved sensitivities between .58 and 1.00, and specificities between .64 and .91 for cannabis, amphetamines, sedatives, and opiates disorders (Newcombe et al., 2005).

The Reasons for Drug Use Screening Tests (RDU; Grant, Hasin, & Harford, 1988) is a 31-item screening instrument designed to detect abuse of and dependence on substances used illicitly or more than prescribed. The scale focuses on reasons for drug use and includes items assessing drug use and problems indirectly via questions about avoidance or relief of pain or psychological discomfort and achievement of psychological or social enjoyment from drug use, such as, “I use drugs when I feel bored.” The scale had excellent internal consistency ($\alpha = .98$) in a sample of patients with alcohol-related disorders (Grant et al., 1988). The instrument was found to have a sensitivity=.73, specificity=.79, PPV=.47, NPV=.92, accuracy rate=.77, and AUC=.85 (Rosenberg et al., 1998, details of the study mentioned above under the DALI instrument).

The Drug Use Screening Inventory (DUSI; Tarter & Hegedus, 1991; Tarter & Kirisci, 1997) is a 149-item instrument that was developed to evaluate the current severity of substance (including alcohol and drugs) involvement in conjunction with its behavioral, social and health correlates. It is a comprehensive measure to quantify severity of substance use-related problems in 10 domains (e.g., substance, work, family). Two of the 10 domains contain items specific to substance use. However, these subscales are not recommended to be used independently for assessing substance use and related problems because the standard scoring procedure requires information from all 149 items (Tarter & Hegedus, 1991). Tarter and Kirisci (1997) validated the instrument on two groups of participants. One group of participants ($N = 119$) was recruited from chemical dependency treatment programs, where 100% of the participants had at least one alcohol abuse or dependence diagnosis, and 63% of the participants having at least one additional substance use disorder. The second group of participants ($N = 119$) was recruited by advertisement and public service announcements, and none of the participants in this group had a substance use disorder. The DUSI was validated against substance use disorder diagnoses determined by a modified version of the Structured Clinical Interview for DSM-III-R (Spitzer et al., 1988). A cut-point of 4 and above provided a sensitivity=.80, specificity=1.0, and an accuracy rate of 72% (Tarter and Kirisci, 1997).

The Two-item Conjoint Screening (TICS; Brown, Leonard, Saunders, & Papasouliotis, 1997) test was developed to screen for alcohol and other drug abuse or dependence in a primary care setting. The two items ask about both alcohol and drug use in the past year: “Have you ever drank or used drugs more than you meant to?” and “Have you felt you wanted or needed to cut down on your drinking or drug use?” The TICS was validated on a sample of 434 primary care patients, slightly over a quarter of whom had a current SUD, with 9% having a current DUD (with or without an alcohol disorder). Cannabis and cocaine abuse/dependence were the most prevalent DUDs (6% and 2.3%, respectively). Using diagnoses from the Composite International Diagnostic Interview—Substance Abuse Module (CIDI—SAM; Cottler, Robins, & Helzer, 1989) as the criterion for presence or absence of SUD, the TICS had a sensitivity=.81 specificity=.81, PPV=.69, and NPV=.93, in detecting a current substance use disorder.

The Rapid Drug Problems Screen (RDPS; Cherpitel & Borges, 2004) is an adapted version of the Rapid Alcohol Problems Screen (RAPS), which consists of five items selected from the CAGE, BMAST, AUDIT, and TWEAK to screen for alcohol abuse and dependence (Cherpitel, 1995). There also is a 4-item version of the RAPS (RAPS4; Cherpitel & Bazargan, 2003), and the RDPS is adapted from the RAPS4 (Cherpitel & Borges, 2004). Validation of the RDPS has been reported on a sample of 703 patients (423 males and 280 females) at an emergency department in Mexico City. For males, sensitivity and specificity were greater than 90% for both drug dependence, and drug dependence or drug abuse. However, the measure performed poorly for female patients and sensitivity and specificity data were not reported (Cherpitel & Borges, 2004).

The Drug Use Disorders Identification Test (DUDIT; Berman et al., 2005) is an 11-item self-report questionnaire that provides information on the level of drug intake and fulfillment of selected criteria for substance abuse/harmful use and dependence according to the ICD-10 and DSM-IV diagnostic systems. Items include: “How often do you use drugs other than alcohol?” and: “How many times do you take drugs on a typical day when you use drugs?” The instrument was tested in a Swedish sample of heavy drug users ($N=154$) from prison, probation, and inpatient detoxification settings, and with a diagnostic criterion ascertained by the Schedules for Clinical Assessment in Neuropsychiatry (SCAN, WHO, 1999). A random sample of 1109 persons, 16 years and older, in the general Swedish population was included as a control group. The DUDIT had a sensitivity=.90 for identifying drug dependence according to both the DSM-IV and ICD-10 criteria, and a specificity of .78 and .88, for the two diagnostic systems, respectively. AUC=.56, .50, and .94 for harmful use, drug abuse, and drug dependence, respectively (Berman et al., 2005).

The Drug Abuse Screening Test (DAST; Skinner, 1982) is a 28-item self-report questionnaire designed to identify drug problems in the previous year. Shorter 20-item and 10-item versions of the DAST also are available. Both the DAST-20 and DAST-10 have demonstrated good internal consistency ($\alpha>.85$) and test–retest reliability ($r>.70$) in psychiatric samples (Cocco & Carey, 1998). Compared to the SCID (Spitzer et al., 1988) the DAST had a sensitivity=.67, specificity=.68, PPV=.35, NPV=.89, and AUC=.70 in a sample of severely mentally ill patients ($N=247$), 21.9% of who had a cannabis- and/or cocaine-related disorder (Rosenberg et al., 1998). Wolford et al (1999) reported that the DAST demonstrated sensitivity=.72, specificity=.77, PPV=.46, NPV=.91, accuracy rate=.74, and AUC=.77 against drug use diagnoses that were identified by the SCID (Spitzer et al., 1988) and the Clinician Rating Scale (Drake et al., 1990), in a sample of 320 patients with severe mental illness, 69 of who (21.6%) had a cannabis-and/or cocaine-related disorder. In another study, the DAST-10 yielded a sensitivity=.85, specificity=.78, PPV=.35, NPV=.97, and accuracy rate=.79 against drug use diagnoses identified by the Structured Clinical Interview for the DSM-IV (First, Gibbon, Spitzer, & Williams, 1996) in a sample of 162 severely mentally ill patients (Maisto et al., 2000).

4. Discussion

All of the existing measures have one or more shortcomings that limit their usefulness as drug screens for psychiatric patients. First, most instruments are too long for routine screening in psychiatric settings (see Table 2). Again, as noted by Bradley et al. (2004) and mentioned above, the CAGE (4 items; Ewing, 1984) was used much more widely than the AUDIT even though its psychometric properties were not as good as those of the AUDIT. Only three instruments—the CAGE-Adapted to Include Drugs (CAGE–AID; Brown & Rounds, 1995), the Two-Item Conjoint Screening (TICS, Brown, Leonard, Saunders, Papanouliotis, 1997), and the Rapid Drug Problems Screen (RDPS; Cherpitel & Borges, 2004)—are sufficiently brief for widespread clinical use. Unfortunately, these instruments have other shortcomings as described below.

Second, many existing screeners assess drug behaviors in an inappropriate time frame (e.g., lifetime). Only five instruments—the Drug Use Screening Inventory (DUSI; Tarter & Hegedus, 1991), the Two-item Conjoint Screening (TICS; Brown et al., 1997), the Rapid Drug Problems Screen (RDPS; Cherpitel & Borges, 2004), the Drug Use Disorders Identification Test (DUDIT; Berman et al., 2005), and the Drug Abuse Screening Test (DAST; Skinner, 1982)—measure current substance related problems in the past 12 months. Third, only two instruments (APS and AAS) have separate validity information for female and male psychiatric patients (Stein et al., 1999). However, again, there are many other shortcomings of these two instruments. Fourth, none of the drug screeners has been validated for drug-related consequences in any population; instead, drug use disorder diagnoses have been the criterion.

Fifth, many screeners use questions that inquire about both alcohol and drug use (e.g., CAGE–AID, SMAST–AID, and TICS). Therefore, results of the validation studies presented in Table 3 reflect psychometric properties (e.g., sensitivity and specificity) that may not reflect accurately the instruments’ psychometric properties as drug screens. Similarly some instruments contain items that focus primarily on alcohol rather than on drugs, such as the Addiction Potential Scales (APS; Weed et al., 1992) and the Addiction Acknowledgment Scale (AAS; Weed et al., 1992) Revision with an exclusive drug focus and validation studies on the revised instruments would be necessary if these instruments were to be adopted as drug screens. Sixth, some screeners, such as the Dartmouth Assessment of Lifestyle Instrument (DALI; Rosenberg et al., 1998) and the Kreek–McHugh–Schluger–Kellogg Scale (KMSK; Kellogg et al., 2003), have been validated for the most prevalent drugs only, such as cocaine, and their performance with patients having other drug disorders is unknown.

Seventh, some instruments (e.g., KMSK, DALI, ASSIST) use complicated scoring algorithms and thus are inappropriate for routine clinical use. In the future, if computerized screenings become standard clinical practices, future studies should examine the appropriateness of such instruments for clinical settings. Eighth, some screeners such as the SASSI-3 (Miller & Lazowski, 1999), DAS (Millon, 1983), APS and AAS (Weed et al., 1992) rely on very subtle

questions, such as “I frequently notice my hand shakes when I try to do something” and “I have never been in trouble with the law.” Such instruments perform less well than those with more direct questions (Svanum & McGrew, 1995). Subtle questions were purported to circumvent denial in order to accurately detect drug use regardless of the respondent’s honesty or awareness. However, in a review of studies that encompassed a total *N* of 22,110 participants, no empirical evidence was found for the claimed unique advantage of the SASSI in detecting drug use disorders through subtle questions (Feldstein & Miller, 2006). Therefore, subtle questions are unlikely to be parsimonious enough for a brief screen.

Ninth, some instruments are not appropriate for use as a screener for drug use disorders or consequences of drug use with general psychiatric patients. For example, the SMAST–AID has low sensitivity (Brown & Rounds, 1995) and has been criticized for having many items that are irrelevant or confusing for people with severe mental illness (Searles, Alterman, & Purtil, 1990). The validity of the Drug Dependence Scale (DDS; Millon, 1994) has been questioned because only a few of its items specifically address drug-related issues (Bryer et al., 1990), and it tends to identify fewer than 50% of respondents with a drug disorder (Bryer et al., 1990; Calsyn et al., 1990, 1991). The DALI may lack validity as a drug screen because it includes a question about money spent on alcohol (Rosenberg et al., 1998). Two of the ten domains of the Drug Use Screening Inventory (DUSI; Tarter & Hegedus, 1991) contain items specific to substance use (as opposed to it correlates), but these subscales are not recommended for independent use to assess drug use and related problems (Tarter & Hegedus, 1991).

Finally, some instruments, such as the ASSIST (Newcombe et al., 2005), KMSK (Kellogg et al., 2003) and the DALI (Rosenberg et al., 1998), inquire about individual categories of drugs (e.g., cocaine, cannabis), whereas other measures refer to any drug use, such as the Drug Use Disorders Identification Test (DUDIT; Berman et al., 2005), Drug Abuse Screening Test (DAST; Skinner, 1982), CAGE–AID (Brown & Rounds, 1995), and TICS (Brown et al., 1997). The former approach provides specific information about the drugs that a patient uses; therefore, clinicians are able to provide feedback related to the specific risks associated with particular drugs (Newcombe et al., 2005). However, the latter approach of asking about “drugs” in general seems more parsimonious for screening purposes. Using this approach, the DUDIT and DAST, for example, achieve reasonable results with relatively few questions (Berman et al., 2005; Cocco & Carey, 1998; Maisto et al., 2000). Thus, future drug screen development studies should consider asking about drugs in general in order to reduce the length of the instrument.

Given the lack of an ideal screening instrument, the DAST may be potentially beneficial in some clinical settings. The DAST has a number of strengths, including an appropriate timeframe (12 months), assessment of all drugs, and validation with psychiatric samples in multiple studies. Nevertheless, the DAST may be beneficial only in settings where longer instruments are feasible (10 or more items). In addition, the DAST has less than optimal sensitivity and specificity and has not yet been validated separately for men and women or for drug use problems.

Over 10 years ago Drake, Mueser, Clark, and Wallach (1996) observed: “The assessment methods that are used currently [to identify dual diagnosis patients] need to be made more reliable and easier to apply” (p. 48). Unfortunately, that need continues to exist today. Existing instruments are not appropriate for routine screening of psychiatric patients for drug disorders and consequences. Future studies are necessary to revise current instruments or develop new instruments that satisfy all or most of the following conditions: (1) being brief, (2) focusing on an appropriate timeframe (past 12 months), (3) being validated on both male and female psychiatric patients, (4) being validated for both drug use disorders and drug-related problems, (5) focusing on illicit drugs (not alcohol), (6) being validated for common and uncommon drugs, (7) using simple scoring algorithm, and (8) avoidance of subtle questions.

The availability of a brief and easily administered screen could improve care and reduce health care costs for patients with co-occurring psychiatric and drug problems. It likely would increase mental health providers’ willingness to screen for drug use disorders and drug-related problems. Widespread screening for drug use disorders and problems in psychiatric settings has the potential to normalize discussion of drug use between health care providers and patients, and reduce potential stigma and discomfort (Fiellin, Reid, & O’Connor 2000). In turn, more patients with drug-related consequences and problems could be identified, further assessed as needed, and appropriately managed and treated, either within the psychiatric care system, dual diagnosis programs, or in SUD specialty care. Screening for DUDs and drug-related problems among psychiatric patients, especially if it led to early detection, would result in better patient management, better patient psychiatric and drug-related outcomes, reduced health care utilization, and potential savings to health care systems.

The availability of a brief, validated drug screen also should stimulate and facilitate important new research that could improve care for psychiatric patients with drug-related problems. Research could identify patients whose

screening scores indicate a need for different intensities of intervention. For example, after patients are screened, severe patients (those with high scores on the drug screen and confirmed by further assessment) might benefit most from referral to specialty SUD or dual diagnosis integrative care, whereas patients with mild drug problems (those with lower scores on the drug screen) might only need brief interventions by non-SUD MH providers. The effectiveness and cost-effectiveness of brief interventions within the MH system for patients with less severe drug-related problems could be examined; similarly, the effectiveness and cost-effectiveness of referral procedures and processes aimed at a high follow-through rate for patients to receive treatment in the specialty SUD settings could be determined.

With appropriate screening, early detection and appropriate management of DUD and drug-related problems in the mental health system, there may be a ripple effect to other systems of care. That is, once a brief drug screen is developed for the MH system, the drug screen could be modified and/or validated for use in other systems, such as the primary care system, which is in need of such a screen (e.g., McPherson & Hersch, 2000). Furthermore, a brief screen that is tailored for patients in MH care also could be validated and/or adapted for other populations that may have a high prevalence of drug-related disorders or problems, such as individuals with HIV, trauma patients (Soderstrom et al., 1997), and individuals who have experienced physical or sexual abuse or severe combat-related stressors. In short, tremendous benefits would result from the availability of a brief, validated illicit drug screen for patients with psychiatric disorders.

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