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BEHAVIORAL BIO-MEDICAL INTERFACE (JL BROWN AND RJ DICLEMENTE, SECTION EDITORS)

Substance Use Screening in HIV Care Settings: a Review and Critique of the Literature

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Abstract

Purpose of Review People living with human immunodeficiency virus/AIDS (PLWHA) experience high prevalence of substance use disorders (SUD). HIV care settings represent a unique opportunity to identify possible SUD, to provide SUD interventions, and to improve linkage to SUD treatment. The aims of this paper are to (a) review and critique the extant literature examining substance use screening approaches among PLWHA in HIV care settings and (b) provide recommendations for future clinical practice.

Recent Findings Twenty-one peer-reviewed articles that examined substance screening approaches employed in HIV and other primary care settings were included in the review. There was limited literature reporting on the implementation and evaluation of substance use screening practices within HIV care settings, and methodological rigor varied across studies. Further, the use of validated substance use screening measures or incorporation of other substance use screening approaches (e.g., use of urine drug testing) within routine HIV care practice is limited. Strategies to implement routine substance use screening within HIV care and incorporate additional substance use assessment, brief interventions, and referral to specialty substance use treatment are discussed.

Summary Use of self-report substance use screening measures using web- or computer-delivered approaches that can be integrated within electronic health record systems is particularly promising. HIV care practices should consider potential models to optimally screen and treat SUD. Co-location of HIV and SUD treatment services may be optimal; when co-located services are not possible, strategies to consistently provide brief intervention approaches and referrals to specialty SUD treatment are needed.

Keywords Substance use · HIV/AIDS · Screening · Screening, brief intervention, and referral to treatment (SBIRT) · Primary care

Introduction

An estimated 1.2 million Americans are living with human immunodeficiency virus (HIV) [1] and experience higher prevalence of substance use disorders (SUD) relative to the general population [2, 3]. Indeed, the Substance Abuse and Mental Health Services Administration reported that between 2005 and 2010, nearly one third of individuals who were diagnosed with HIV used illicit drugs or engaged in binge drinking in the past 30 days [4]. During the same period, approximately 24% of people living with HIV/AIDS (PLWHA) in the USA met criteria for SUD, and nearly 17% of PLWHA had a lifetime history of injection drug use [4]. More recent studies have found higher prevalence of SUD among PLWHA; for example, a recent multi-regional US cohort study found a 48% SUD prevalence rate in an aggregated sample of 10,652 PLWHA [5]. Several studies have examined substance use and SUD prevalence rates among PLWHA. The most commonly used substances by PLWHA are tobacco [3, 6, 7] and alcohol [3, 5–8]. Prevalence rates for marijuana use range from 18 to 31% [3, 5, 7], from 7.9 to 11% for stimulant use [7, 9], and approximately 20% are polydrug users [5].

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Seven percent report non-prescription opioid use [5, 6] and injection drug use (IDU). Not only are substance use rates higher among PLWHA than in the general population [3], but the reported proportion of PLWHA with SUD is far greater than in individuals living with other chronic illnesses [10].

Despite the pervasiveness of SUD among PLWHA, underutilization of substance use treatment is high, with an estimated 75% of those meeting criteria for SUD not receiving treatment [11, 12]. HIV care providers addressing substance use with their patients has been associated with increased likelihood of entering substance use treatment [11]. In turn, substance use treatment has been associated with greater retention in HIV care [12]. To optimally identify, treat, and link PLWHA to SUD treatment, there is a need to review substance use screening approaches that have been employed within HIV care settings.

Increased risk of HIV acquisition and transmission is linked to SUD via direct and indirect pathways. IDU heightens HIV risk due to sharing of injection supplies, including needles, syringes, and cookers [13, 14]. Recent estimates suggest that approximately 25% of people who inject drugs (PWID) share injecting equipment including needles [13]. Beginning in the mid-1990s, incident HIV infections attributed to IDU as the primary transmission route declined dramatically in the USA, due in part to greater funding of needle exchange programs [15]. Yet, incident HIV infections are increasing among PWID, suggesting new HIV transmission and acquisition risk in this population [14]. The association between SUD and sexual risk behaviors is well supported in the literature across numerous populations and drug classes. For instance, increased rates of condomless heterosexual sex and a greater number of sexual partners have been reported among substance using PLWHA [8, 9, 13, 16]. Similarly, increased sexual risk behavior in HIV-infected men who have sex with men (MSM) is associated with methamphetamine and polysubstance use during sex [17]. Further, there is evidence suggesting that both substance use and sexual risk behaviors among substance using PLWHA often continue following HIV diagnosis [8, 13, 16–19].

PLWHA with SUD are also more likely to have co-occurring psychiatric disorders [3, 9, 20–22]. Prevalence of co-morbid psychiatric conditions ranges from 18 to 25% across studies [3]. Anxiety disorders [23, 24] and mood disorders [10, 23, 24] are the most frequent co-occurring disorders among PLWHA with SUD. There is also evidence of elevated rates of PTSD [10, 24] and personality disorders [21] in this population, and higher prevalence of serious mental illness in PLWHA with SUD has been observed [25]. Moreover, PLWHA with comorbid SUD and psychiatric conditions often endorse a higher severity of psychiatric symptoms than do seronegative matched samples [26].

Substance use is also associated with other health complications in PLWHA. Elevated risk for cardiovascular disease, chronic obstructive pulmonary disease (COPD), and lung cancer has been reported in association with this population [7]. In addition, higher levels of alcohol or marijuana use have been associated with a greater likelihood of having other sexually transmitted infections, which, in turn, has been associated with higher HIV infectiousness [27]. IDU also increases risk for hepatitis C virus (HCV) among PLWHA [9, 13, 28, 29], and PLWHA with co-morbid HCV are at increased risk for liver disease [9]. Additional health complications associated with SUD contribute to increased morbidity and mortality among PLWHA.

Problematic substance use has been linked to poor outcomes at every stage of the HIV care continuum from uptake of HIV testing to sustained virologic control. Despite having an elevated risk for infection, individuals with SUD are less likely to engage in routine HIV testing, which may delay linkage to HIV treatment [30, 31]. Among those who receive an HIV diagnosis, there is an observed delay in linkage to care among PLWHA with SUD. For example, a qualitative study revealed that a subset of newly diagnosed PLWHA with SUD increased their substance use following diagnosis as a form of coping, which precluded initiation of care [31]. Once in care, effective treatment engagement and retention are problematic for those with SUD [12, 31–33]. This may be due to individuals making substance use behaviors a priority over HIV care or fear of adverse side effects and drug interactions with non-prescription substance use [31]. Poor adherence to antiretroviral therapy (ART) is prevalent among this population [3, 31, 33]. Non-adherence has largely been attributed to forgetting to take medication during episodes of substance use [31], which in turn is related to lower CD4 cell count [3] and not achieving viral suppression [32, 33]. Several studies also suggest that accelerated HIV disease progression among substance users cannot be fully accounted for by decreased ART adherence alone. In particular, IDU is associated with increased time to AIDS diagnosis when compared to non-injection drug users and MSM [30, 34]. Likewise, stimulant use has also been associated with accelerated disease progression and development of AIDS defining illnesses, when controlling for ART adherence [30, 35–37]. Collectively, these findings highlight the intersection between SUD and poorer outcomes across the HIV care continuum.

SUD prevalence is high among PLWHA, and substance use is predictive of engaging in behaviors associated with both risk of HIV infection and transmission. In addition, co-occurring psychiatric illness may foster continued substance use and its associated risk behaviors, contributing to poor HIV-related outcomes. PLWHA with SUD who receive SUD treatment are better retained in care, report more consistent ART adherence, and are more likely to

have sustained virologic control. For PLWHA, HIV primary care is often their medical home, which represents a unique opportunity to identify possible SUD and to initiate or provide linkage to SUD treatment for this population. Thus, improving the identification of PLWHA with SUD in HIV care settings is of critical importance. The aims of this paper are to (a) review and critique the extant literature on substance use screening approaches among PLWHA in HIV care settings and (b) provide recommendations for future clinical practice.

Methods

A search of published, peer-reviewed articles was conducted from December 2017 through March 2018 using the following strategies: (a) electronic database search (PubMed, Academic Search Complete, Consumer Health Complete—EBSCOhost, ERIC, Health and Psychosocial Instruments, Health Source: Nursing/Academic Edition, MEDLINE, MEDLINE with Full Text, Psychology and Behavioral Sciences Collection, PsycINFO, Google Scholar) and (b) retrieving articles included in existing reviews and meta-analyses [30, 38]. Peer-reviewed articles were identified utilizing Boolean searches of combinations of the following key terms: (HIV/AIDS OR people living with HIV/AIDS OR PLWHA) AND (HIV treatment OR HIV primary care) AND (substance use screening OR abuse OR problems OR addiction OR SBIRT OR screening, brief intervention, and referral to treatment) AND (substance use OR substance abuse OR drug use OR drug abuse OR dependence OR addiction). Electronic database searches were limited to manuscripts published within the previous 10 years that were available in English. Upon reviewing titles and abstracts, full-text manuscripts were retrieved to determine whether studies were relevant for inclusion. Empirical studies that examined or commented on (a) addressing underreporting of substance use, (b) improving the detection of problematic substance use in HIV care, (c) client acceptability of substance use screening practices within HIV care, or (d) feasibility of implementation of substance use screening methods in HIV care were included. While this paper is focused on substance use screening among PLWHA in HIV care settings, the broader literature on substance use screening in other care settings (e.g., emergency department) was also reviewed to inform recommendations for future HIV clinical practice. In total, 21 articles were reviewed: (a) 14 reported on substance use screening in HIV care, (b) 5 reported on substance use screening in other health care settings, and (c) 2 reported on substance use interventions in HIV care.

Results

Reliance on Self-Reported Substance Use

Providers often rely on patient self-reported substance use to identify PLWHA who may have a SUD. However, PLWHA may be less likely to disclose problematic substance use directly to providers. For example, findings from Delker et al. indicate that PLWHA may be more likely to under-report substance use on an interviewer-administered timeline follow-back [39], as compared to an audio computer-assisted self-interview (ACASI). Recall and social desirability biases [40], poor communication between PLWHA and providers [41], distrust of healthcare institutions [42], and concerns regarding confidentiality [43] all may contribute to under-reporting of drug use among PLWHA in HIV care settings [44•]. In addition, face-to-face interview assessments of substance use by providers may result in problematic substance use being unrecognized not only due to patient under-reporting, but also due to providers' use of unvalidated assessments [45, 46•]. Further, provider assessment of substance use has been associated with infrequent and inconsistent provider follow-up when potentially problematic substance use is identified. For example, in one study, only 52% of patients classified as "problem drinkers" according to a validated screening tool (i.e., CAGE) [47] had discussed alcohol use with their infectious disease providers in the past 12 months [48]. This issue may be addressed by HIV care clinics consistently using validated patient self-report screening tools to facilitate detection of problematic substance use among PLWHA and guide provider follow-up recommendations.

Extant literature also suggests that substance use biomarkers (e.g., urine drug testing) may be useful adjuncts to self-report substance use measures to screen for substance use in HIV care [49]. For example, research has found inconsistency between self-reported alcohol abstinence and positive phosphatidylethanol (a biomarker for alcohol use) among PLWHA [50, 51]. However, based on the current review of literature on substance use screening practices in HIV care settings, few studies have examined strategies to integrate biological assays of substance use within the context of HIV care practice models.

Validated Self-Report Substance Use Screening Measures

Several empirically supported and psychometrically validated screening tools for substance use have been used among PLWHA. Screening measures utilized include The Car, Relax, Alone, Forget, Friends, and Trouble (CRAFFT) [27, 52] for identifying problematic drug and alcohol use among youth living with HIV/AIDS (YLWHA), the Alcohol Use Disorders Identification Test (AUDIT) [53, 54], Alcohol,

Smoking and Substance Involvement Screening Test (ASSIST) [55, 56], the CAGE questionnaire [57, 58], the Drug Abuse Screening Test (DAST-10) [59, 60], and the Substance Abuse and Mental Illness Symptoms Screener (SAMISS) [61, 62]. However, clinic utilization of self-report measures for detecting problematic substance use has typically been low [63]. Minimizing disruption of clinic flow is a priority when integrating substance use screening into busy HIV care settings; screening measures must be sensitive yet brief, informative yet not overly time consuming, and easily interpretable. Table 1 provides summary information pertaining to each substance use screening measure as a resource for HIV care providers.

Delivering self-report screening tools using web-based or computer-delivered technology has been shown to facilitate substance use screening in HIV care [46•]. Such models have patients use computers or touch-screen tablets to respond to substance use screening instruments, including the AUDIT [53] and the ASSIST [55]. This method may not only reduce under-reporting but may also improve clinic flow by providing automated scoring and assessment feedback reports for providers. This approach offers promise to seamlessly record responses within existing electronic medical records. However, successful implementation of this approach may require reorganization of clinic procedures. For example, Fredericksen et al. made the following recommendations for integrating web-based substance use screening in HIV care: (1) require that patients check-in with front desk staff upon arriving 20 min prior to scheduled appointment time, (2) have patients complete electronic-based assessments after having vitals checked, (3) forgo screening assessment if patients arrive more than 10 min after their scheduled appointment time, (4) notify nursing and administrative staff when extra time is available due to provider delays as opportunities for patients to complete screeners, (5) track patient flow more consistently, and (6) provide real-time results of screening to providers [46•].

Recommendations for Implementing Substance Use Screening in HIV Care

Based on the available literature and identified limitations of substance use screening in HIV care settings, the following recommendations are provided to integrate substance use screening while minimizing disruptions of clinic flow. First, HIV care practices should consider including a validated, self-report substance use screening measure (such as those listed in Table 1) in intake paperwork for all patients at their first appointment and employ ongoing screening practices at follow-up appointments. Before implementation of substance use screening, staff should consider patient flow during a clinical encounter and develop clinic procedures to integrate substance use screening within existing clinic workflows. When possible, clinics should use electronic or web-based platforms to reduce potential under-reporting, provide real-time results to providers on screening results, and facilitate recording of screening responses within electronic medical record systems. Screening results should be shared with PLWHA. Providers may also benefit from provision of clinical decision support tools to inform SUD intervention and treatment recommendations based on screening results. PLWHA with past positive screenings for SUD should receive consistent follow-up regarding current substance use. Substance use screening should be utilized to identify PLWHA who would benefit from further assessment of substance use, receipt of brief intervention approaches, or referral to specialized SUD treatment. As such, clinics should identify potential strategies and intervention approaches to address a positive substance use screening result before implementation of new screening procedures.

Discussion

Screening is often the first step to identify and address substance among PLWHA [64]. However, non-compliance with referrals to substance use assessment or treatment is a concern [65, 66]. One approach to address this issue is to standardize screening and referral procedures and integrate brief interventions within primary medical care settings (e.g., HIV care clinics, hospital emergency departments). Co-location of HIV and SUD treatment may be optimal when feasible. However, Screening and Brief Intervention (SBI) and Screening, Brief Intervention, and Referral to Treatment (SBIRT) approaches are alternative models that have been used in various clinical settings to identify individuals with elevated levels of substance use at risk for developing a SUD as well as individuals who may require specialty SUD treatment. Both models include systematic substance use screening, brief time-limited interventions that tend to include one to two counseling sessions between 10 and 30 min, and referral to substance use treatment if deemed clinically warranted [66, 67]. Brief interventions are delivered by trained clinicians and often include feedback on personal risk (e.g., screening results) to increase patients' awareness of substance use levels, emphasis on patient responsibility, a menu of change options, and fostering patient self-efficacy to implement self-managed behavior change and reduce substance use [66, 68]. The majority of brief interventions use motivational interviewing (MI) techniques to increase patient awareness of substance use behaviors and self-efficacy to reduce substance use [67]. Care settings that use SBI and SBIRT strategies often use the ASSIST self-report tool to screen for substance use [67, 69, 70], with a low threshold for qualifying for a brief intervention (e.g., total score of 4 for most substances and 11 for alcohol). A comprehensive

Table 1 Self-report substance use screening measures for potential use in HIV care settings

Screening measure	Substance(s) assessed	Sample item	Response options	No. of items	Time to complete	Scoring metric	References and resources
Car, Relax, Alone, Forget, Friends, and Trouble (CRAFFT)	Alcohol and "illegal drugs"	"Do you ever use alcohol or drugs to relax, feel better about yourself, or fit in?"	Yes/no	9	> 5 min	Yes = 1; no = 0 Sum score ≥ 2 indicates positive screen and warrants further assessment	Knight et al. (2002), Gamarel et al. (2017) Available at http://www.ceasar-boston.org/CRAFFT/pdf/CRAFFT_English.pdf
Alcohol Use Disorders Identification Test (AUDIT)	Alcohol	"How often during the last year have you found that you were not able to stop drinking once you had started?"	Five-point Likert scale; anchors vary by item stem (e.g., 0—never, 1—less than monthly, 2—monthly, 3—weekly, 4—daily or almost daily)	10	> 10 min	Sum score ≥ 8 indicates positive screen for hazardous or harmful alcohol use	Bradley et al. (2003), Surah et al. (2013) Available at http://whqlibdoc.who.int/hq/2001/who_msd_msb_01.6a.pdf
Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)	Tobacco, alcohol, cannabis, cocaine, amphetamines, sedatives, hallucinogens, inhalants, opioids, other drugs	"Has a friend or relative or anyone else ever expressed concern about your use of (first drug, second drug, etc.)?"	Likert scale; anchors vary by item stem	8	5–10 min	Sum scores: • Alcohol: 0–10 = low risk, 11–26 = moderate risk, ≥ 27 = high risk • Any other substance: 0–3 = low risk, 4–26 = moderate risk, ≥ 27 = high risk Recommendations: low risk—provide information, moderate risk—provide or refer to brief intervention, high risk—provide or refer to more intensive treatment Global continuum of risk score: sum items (questions 1–7) + question 8 for all drug classes together	WHO ASSIST Working Group (2002); Machado et al. (2017) Available at http://www.ct.gov/dmhas/lib/dmhas/publications/SBIRT-ASSIST.pdf Additional information available at http://www.who.int/substance_abuse/activities/en/Draft_The_ASSIST_Guidelines.pdf
Cutting down, Annoying you, Guilt, and Eye-opener (CAGE) and CAGE Questions Adapted to Include Drug Use (CAGE-AID)	Alcohol and drugs (generalized term used on screener)	"Have you ever had a drink or used drugs first thing in the morning to steady your nerves or to get rid of a hangover (eye-opener)?"	Yes/no	4	> 5 min	Yes = 1; no = 0 Sum score ≥ 2 is positive screen	Ewing (1984), Samet et al. (2004) Available at https://www.hopkinsmedicine.org/johns_hopkins_healthcare/downloads/CAGE%20Substance%20Screening%20Tool.pdf

Table 1 (continued)

Screening measure	Substance(s) assessed	Sample item	Response options	No. of items	Time to complete	Scoring metric	References and resources
Drug Abuse Screening Test-10 (DAST-10)	Cannabis (marijuana, hash), cocaine, heroin, narcotic pain medications, sedatives (benzodiazepines), or stimulants (amphetamines)	"Have you neglected your family because of your use of drugs?"	Yes/no	10	> 5 min	Yes = 1; no = 0 Sum score: 0 = no problems reported, 1–2 = low level problems, 3–5 = moderate level problems, 6–8 = substantial level problems, 9–10 = severe level problems Suggested actions: low level—monitor and re-assess later, moderate level—further investigation, substantial level—intensive assessment, severe level—intensive assessment	Skinner (1982), Parsons et al. (2014) Available at http://www.bu.edu/bniart/files/2012/04/DAST-10_Institute.pdf Additional information: http://www.masbirt.org/sites/www.masbirt.org/files/documents/toolkit.pdf
Substance Abuse and Mental Illness Symptoms Screener (SAMISS)	Alcohol and drugs (generalized term used on screener)	"In the past year, how often did you use nonprescription drugs to get high or to change the way you feel?"	Response options vary with item stem (e.g., never, less than monthly, monthly, weekly, daily, or almost daily)	SU 7 Mental illness 9	5–10 min	Respondent screens positive if sum of responses to questions 1–3 $\geq$ 5, response to question 4 or 5 is $\geq$ 3, or response to question 6 or 7 is $\geq$ 1	Pence et al. (2005), Whetten et al. (2005) Available at cahpp.org/wp-content/uploads/2017/05/SF-SAMISS-Questionnaire.pdf Additional information available at https://www.dshs.texas.gov/hivstd/contractor/cm/SAMISStoolpluskey16Q.pdf

review of the literature supports SBI and SBIRT approaches in medical care settings as efficacious in reducing alcohol use among non-dependent individuals with elevated levels of alcohol use. However, the efficacy of brief interventions for reducing other drug use within HIV and other primary care settings has not been well supported in the literature [66, 68, 69], and researchers have suggested that this may be due to variability in readiness for change, polysubstance use, and SUD severity among individuals with a positive substance use screen [66].

Notably, few HIV clinics have implemented or evaluated SBIRT procedures [70], with patient flow and physician time constraints often cited as barriers. However, there is some evidence supporting the feasibility of SBIRT in HIV care [67, 71], as well as the comparable efficacy of nurse- and physician-led SBIRT in medical settings. Graham et al. examined trends in substance use from 2008 to 2013 in an HIV clinic implementing SBIRT; they noted a downward trend in tobacco; no changes in alcohol, marijuana, crack/cocaine, or opioid use; and increased use of amphetamines. They also found that of the 50–60% of HIV clinic patients who screened positive for elevated substance use (via the ASSIST), approximately 90–100% received a brief intervention, with 20–40% eventually being referred to outside substance use treatment. Rigorous SBIRT efficacy trials conducted in HIV care settings that measure patient substance use outcome data are limited. Cropsey et al. found that an SBIRT model including an MI-based brief intervention delivered in an HIV primary care setting was efficacious in reducing tobacco use (i.e., number of cigarettes smoked daily) among PLWHA; however, the intervention also included nicotine replacement therapy, which may have augmented the overall efficacy observed in the SBIRT condition [72].

Addressing problematic substance use among PLWHA may also require addressing broader environmental or structural challenges. The intersection of HIV and SUD is associated with experiencing other structural adversities. For example, substance use increases the likelihood of criminal justice system involvement [8]. Individuals with SUD are more prone to experience housing instability or homelessness, food insecurity, and a lack of adequate transportation [32]. In addition, problematic substance use may also contribute to poor work performance and attendance leading to unemployment, which predicts increased alcohol use [8]. These additional SUD-related challenges negatively affect health outcomes for PLWHA and highlight the need for intervention approaches to improve SUD screening and treatment coupled with addressing structural factors that may adversely affect treatment outcomes. Such approaches may include strengthening case management services within HIV care and partnering with community-based organizations (e.g., housing assistance programs) to further address the multi-faceted needs of PLWHA.

Limitations and Future Directions

While several rigorous efficacy trials evaluating brief substance use interventions for PLWHA have been conducted in HIV care settings [73, 74], the screening procedures in these trials are often for recruitment purposes and do not represent the typical substance use screening practices that occur in an HIV care clinic on a day-to-day basis. Further, the literature is limited in the methodological rigor by which the reviewed studies examined substance use screening measures (e.g., psychometric characteristics) and practices in HIV care. For example, using the GRADE methodology [75] to evaluate the strength of the literature, only 22% of reviewed studies met criteria for the "high" quality of evidence classification, and nearly 60% of these studies provided recommendations classified as "conditional." Overall, these ratings were due to the high prevalence of observational studies without appropriate comparator conditions. Thus, randomized controlled trials examining substance use screening approaches in HIV care are needed to advance the methodological rigor of research in this area. Additional research on current substance use screening practices within HIV care is needed to better understand the current state of substance use screening among PLWHA. For example, no representative data exists on the prevalence or frequency of substance use screening in HIV care clinics. Moreover, there is a lack of research investigating factors associated with the feasibility and acceptability of substance use screening in HIV care. The use of implementation science research methodologies may be useful to investigate processes associated with the optimal integration of substance use screening approaches.

Conclusions

Problematic substance use and SUD are prevalent among PLWHA and are associated with poor HIV-related outcomes such as medication non-adherence and poor virologic control. Identifying PLWHA who have elevated levels of substance use is of critical importance within the context of HIV care. Research to date suggests that substance use screening in HIV care settings is not systematically employed, and validated brief substance use screening measures are not typically used. Consideration of how to optimally integrate substance use screening in busy HIV care settings without disrupting clinic flow and overburdening providers is needed. Screening must also be accompanied by strategies to further assess substance use, deliver brief SUD interventions, and refer to SUD treatment. Substance use screening may optimize use of clinic resources to identify PLWHA who may need more consistent

monitoring, more frequent visits with their HIV care providers, exposure to brief interventions (e.g., screening feedback, psychoeducation, MI), or referrals to focused SUD treatment. When feasible, consideration of co-located HIV, SUD, and psychiatric treatment services may be an optimal approach to address the multi-faceted healthcare needs of PLWHA with SUD.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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