PATIENT AND PROVIDER CHARACTERISTICS ASSOCIATED WITH COMFORT
DISCUSSING SUBSTANCE USE IN HIV CLINICS

By

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Abbreviations:

AIDS: Acquired Immune Deficiency Syndrome
ARVs: antiretroviral medications
CI: Confidence Interval
GEE: Generalized estimation equations
HIV: Human Immunodeficiency Virus
OR: Odds Ratio
aOR: Adjusted Odds Ratio
PAM: Patient Activation Measure
Substance Use: alcohol and drug use
S.D.: Standard Deviation

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ABSTRACT

Drug and alcohol use is a pervasive problem among HIV-infected patients that can hinder patients' use of antiretroviral medications, harm their health, and complicate patient-provider relationships. Less than half of HIV-infected patients with current substance use report discussing their use with their primary care provider despite the potential benefit of these conversations in decreasing use and increasing engagement in substance abuse treatment.

This analysis utilized data from a cross-sectional analysis of 413 HIV-infected patients and their 45 providers to identify of patient and provider characteristics with high comfort discussing substance use for patients and providers using bivariate and multivariate logistic regression.

Overall, the majority of patients and providers (>70%) reported high comfort discussing substance use. A quarter of patients reported current illicit drug use and 10% reported problematic alcohol use. In multivariate analysis, fewer patient participants reported high comfort discussing substance use when a current drug user (aOR=0.46, 95%CI: 0.28--0.77) or when a current problematic alcohol user (aOR=0.32, 95% CI: 0.15 -- 0.66) compared to non-users. Higher patient self-efficacy (aOR=1.96, 95% CI: 1.08--3.54) and high levels of patient activation (aOR 2.66, 95% CI 1.24--5.69) were associated with increased odds of high patient comfort.

In multivariate analysis of provider comfort, the proportion of patients a provider saw that were on antiretroviral therapy was inversely associated with the odds of high provider comfort (aOR 0.38, 95% CI 0.15-0.97), while the proportion of patients a

provider saw with the highest level of patient activation was positively associated with odds of provider comfort (aOR 2.86, 95% CI: 1.01--8.14).

This research identifies that the patients most likely to benefit from a discussion of their substance use, those with current drug or alcohol use, are the least likely to report comfort discussing that use. Providers are more likely to report high comfort if they see patients with high patient activation. These patient and provider characteristics may be targets for future interventions to improve patient-provider communication regarding drug and alcohol use in HIV clinic settings.

1. INTRODUCTION

Drug and alcohol use has far-reaching implications for the health care of HIV-infected individuals. Substance use may negatively impact health through poor medication adherence, HIV disease advancement, and increased HIV transmission behaviors (Andersen et al., 2000), (Carrico, 2010), (Turner et al., 2001). Current drug use is associated with decreased health-related quality of life in HIV-infected patients (Korthuis et al., 2008). Patients are also likely to cease antiretroviral (ARV) use during periods of alcohol consumption (Kalichman et al., 2009). In addition, alcohol use speeds the progression of liver disease in patients co-infected with Hepatitis C virus and decreases CD4 counts (Benhamou et al., 1999), (Cheng et al., 2007).

HIV-infected patients with the dual diagnosis of substance use and mental health illness are significantly less likely to be on ARVs than their single diagnosis peers (Tegger et al., 2008). In patients not on ARVs, heavy alcohol users have lower CD4 counts than their non-drinking peers (Samet et al., 2007).

Drug and alcohol use, whether current or historical, is a common co-morbidity in the HIV treatment settings. It is estimated that between 50% and 75% of HIV-infected individuals used illicit drugs or had heavy alcohol use in the prior year (Sohler et al., 2007), (Korthuis et al., 2008).

Fortunately, treatment for substance use disorders improves the health of HIV-infected patients, with improved ARV adherence, regular primary care and decreased hospital utilization along with improvement of common medical illnesses impacted by substance use (Turner, Laine, Cosler, & Hauck, 2003), (Messeri, Abramson, Aidala, Lee, & Lee, 2002) (Kapadia et al., 2008).

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Despite the well-established benefits of substance use treatment and the known negative impacts of drug and alcohol use on the health of HIV-infected individuals, less than half of HIV-infected patients report a discussion on substance use with their provider in the past 6 months (Korthuis et al., 2008) (Metsch et al., 2008).

Providers are often more comfortable discussing smoking cessation than other substance use with their patients (McCormick et al., 2006), (Aira, Kauhanen, Larivaara, & Rautio, 2004). The reasons for providers' reluctance to screen are multifaceted. Providers often fear offending or alienating their patients, they lack the time to address the issue, or the knowledge or self-efficacy on screening tools. Many also report hesitations over correctly diagnosing the abuse or providing resources to substance users (Johnson, Booth, & Johnson, 2005), (Nygaard & Aasland, 2010). Additionally, "prevention fatalism" or the physician-held belief that prevention efforts will have little impact on the health of their patient may lead to decreased screening for HIV transmission behaviors (Myers et al., 2007). Negative physician attitudes toward injection drug use are also associated with worse HIV-related outcomes (Ding et al., 2005). Additionally, the quality of communication between HIV-infected patients and their provider is poorer in patients with problematic alcohol use (Korthuis et al., 2010).

Provider reluctance to screen for substance use is unfortunate as patient-provider discussions are associated with decreased substance use and increased treatment for substance use disorders (Fleming, Barry, Manwell, Johnson, & London, 1997), (Fleming, Manwell, Barry, Adams, & Stauffacher, 1999), (Ockene, Adams, Hurley, Wheeler, & Hebert, 1999), (Fleming et al., 1999), (Whitlock et al., 2004).

There is scant research on factors influencing patients' decisions to discuss current drug or alcohol use with their provider. Metsch and colleagues (Metsch et al., 2008) found that HIV-infected patients with poorer health and those with a higher perception of provider engagement were more likely to report a discussion on alcohol use with their provider.

In the outpatient clinic setting, discussions of drug or alcohol use are an important yet often missed opportunity to improve the quality of health in HIV-infected patients. The decision to disclose drug use on the part of the patient likely arises from individual characteristics along with those of their provider.   A provider's decision to ask patients about substance use varies among individual providers and it varies even within an individual provider based on their relationship with a particular patient.

There is a paucity of literature on comfort discussing substance use from the perspective of either the patient or provider. There is no literature to describe the population of patients or providers with high comfort discussing substance use. Intuitively, high comfort discussing substance use would be associated with conversations regarding use, yet there is no previous research to support this.

This study aimed to describe the characteristics of patients and providers reporting high comfort discussing substance use in the HIV outpatient treatment setting. Utilizing data from a study on the communication behaviors of HIV-infected patients and their providers this study analyzed patient and provider characteristics associated with self-reported high comfort discussing substance use for providers and patients separately. Additionally, this study investigated if high comfort discussing substance use by patients

or providers was associated with the presence or absence of any discussion on substance use at the office visit.

I hypothesized that current substance users would be less comfortable discussing their use than their non-using peers and physicians with more experience taking care of HIV-infected patients would report more comfort talking to their patients about their use and that high comfort patients and providers would be more likely to mention substance use at the office visit.

2. METHODS

Study Sample and Data Collection

This secondary analysis utilized data from the Enhancing Communication and HIV Outcomes (ECHO) study; a cross-sectional study aimed at investigating HIV-related clinical outcomes and patient-provider communication collected from 2007-2008.

Patients and providers were recruited from four HIV outpatient clinics in Baltimore, Detroit, New York City and Portland, OR. Institutional Review Boards (IRB) at each facility approved this study. The original study was approved by the IRB at Oregon Health & Science University (IRB #2293). Original methods have been published previously (Korthuis et al., 2010).

Providers were eligible if they provided primary care to HIV-infected patients and were a physician, nurse practitioner or physician assistant. All enrolled providers provided informed consent. Enrolled providers completed baseline assessments and after each patient visit filled in a brief after-visit questionnaire specific to that patient.

Patients were eligible if they were HIV-infected, 19 years of age or older, had at least one primary care visit in the last year, and were English speaking. All enrolled patient participants provided informed consent. Trained study personnel enrolled patients from the waiting room of participating clinics and conducted in-person interviews following the office visit with their provider. All enrolled participants completed the informed consent process and were provided with $50 at the end of the study

All enrolled physician-patient interactions were audio-recorded and coded using the Rotor Interaction Analysis System (RIAS) (Roter & Hall, 2004). Research assistants

conducted chart reviews to obtain clinical data (e.g. CD4 count and HIV viral loads) on enrolled patients after the interview.

Outcome Measure

Participants responded to one (patients) or two (provider) questions assessing their comfort. Patients responded to "How comfortable do you feel telling your HIV provider about using drugs or alcohol" with answer options ranged from not at all comfort to very comfortable. Providers responded to two similarly worded questions "Using the scale below, indicate your level of comfort discussing illicit drug use (alcohol use for second question) with patients" with answer options again ranging from not at all comfortable to very comfortable.

Patient and provider comfort variables were dichotomized into a "high comfort" group consisting of individuals reporting the highest level of comfort for both alcohol and drug and a "less than high comfort" group consisting of all other responses.

Covariates

Patient Characteristics: Patient variables consisted of basic demographics and characteristics of the patient including HIV disease status, drug and alcohol use, depression status, communication self-efficacy, and patient activation.

Demographic covariates included self-reported patient gender, race/ethnicity (White, Black, Hispanic, Other), age (years), employment status (employed yes/ no), and educational attainment obtained from interviews. We categorized educational attainment as a high school diploma (yes/no).

Additional patient-related covariates included depression score on the Center for Epidemiologic Studies scale (divided into tertiles of lowest to highest depression scores) (Andresen, Malmgren, Carter, & Patrick, 1994), patient activation (low - high tertiles) (Hibbard, Stockard, Mahoney, & Tusler, 2004), and communication self-efficacy from the communication subscale of the HIV Self Efficacy Questionnaire (Shively, Smith, Bormann, & Gifford, 2002). This subscale consists of 4 questions scored 0-10 with a composite mean final score. In this analysis, high communication self-efficacy was coded yes or no, (yes reflects a mean score of 10 versus all other responses).

Drug and Alcohol Use: Using items from the Addiction Severity Index-lite (ASI) (McLellan, Cacciola, Carise, & Coyne, 1999) current problematic alcohol use was defined as at least one episode of drinking to intoxication in the past 30 days. Current drug use was defined as the use of at least one substance (heroin, cocaine, amphetamines, marijuana or methadone without a prescription) in the past 30 days. The ASI-lite has shown similar identification of drug use severity as the full ASI (Cacciola, Alterman, McLellan, Lin, & Lynch, 2007).

Characteristics of the Patient-Provider Dyad: Duration of the patient-provider relationship was reported by patients and categorized as less than or greater than 5 years in duration. The length of the office visit, which was kept as a continuous variable, was obtained from the office visit audio-recordings.

Provider Characteristics: Provider characteristics included self-reported demographics and characteristics of the provider (e.g. stress, busyness, and training) and characteristics of the patient participants in the study for each provider.

Self-reported provider demographics included gender, age, race/ethnicity (White/ Non-White), type of training (physician/midlevel provider), time spent caring for HIV-infected patients (greater or less than 20 hours per week), and any history of communication training (yes/no).

Provider stress was a composite score composed of four separate questions pertaining to stress over the past month: "how often have you felt …

(1) "…that things were going your way?"
(2) "…things were piling up?"
(3) "…you could handle your problems ?"
(4) "…you were unable to control important things in your life?"

The answer options ranged from never to very often (Cohen, Kamarck, & Mermelstein, 1983). Question 3 was reverse coded in creating a composite score for all responses. These scores were then divided into tertiles and the final variable, high stress (yes/no) consisted of the highest tertile of responses versus medium and low tertiles combined.

Physician busyness was assessed using the question "how would you describe your schedule today" with responses ranging from "much busier than usual" to "slow" after each patient visit. The final variable was dichotomized into very busy (a response of much busier than usual or busier than usual) and not very busy (response of average or slow).

The role of provider confidence in prevention efforts impacting patients with risky behaviors was investigated through the question, "How confident are you that discussing substance use/abuse with your patients will make a difference in their future behavior?" with responses ranging from not at all confident to very confident. Provider

responses were dichotomized into high confidence (a response of very confident) or less than high confidence (all other responses).

Characteristics of the Provider's Practice: For each provider we calculated the proportion of the provider's patients in the study for each characteristic. For example, the proportion of each providers patients that were female, non-white, currently using drugs or alcohol, reporting high comfort, highest depression tertile, and so on for all patient-level characteristics (see above for patient characteristic coding description). Using the median office visit length, the proportion of office visits greater than or equal to the median length was calculated.

These variables were scaled for ease of interpretation in final models to reflect the odds for a ten percent change in proportion.

Mention of Substance Use: All available audiotapes were analyzed for content as part of the overall goals of ECHO to investigate patient-provider communication quality. We utilized a single dichotomous variable on the presence or absence of any mention of drug or alcohol use by patient or provider during the patient visit.

Analysis:

First, descriptive statistics were calculated using overall means and crosstab tables for independent variables by comfort level (high/less than high). For continuous variables, means and standard deviations were calculated.

Bivariate associations between independent variables and comfort were measured using χ^2 analysis for categorical variables, two-sided *t*-tests for continuous variables.

Each provider inherently clustered this study; therefore, the homogeneity of the odds of patient comfort across providers was assessed using Mantel-Haenszel testing. In the provider bivariate analysis Fisher's exact test was utilized for cases where any expected cell count was less than five.

Multivariate Analysis of Patient Comfort:

A base model was created to investigate the relationship of each independent variable to patient comfort while controlling for site and provider clustering alone (base model, column 1, table 2).

Final multivariate model development utilized variables identified from bivariate analysis with a statistical significance of $p \leq 0.20$ and variables of *a priori* interest from the literature. This created a full model from which likelihood ratio and Hosmer-Lemeshow goodness of fit tests were utilized to assess the relative importance of each variable in the model to create a final model (Hosmer & Lemeshow, 2000). Conceptually important variables were re-introduced into the final model regardless of likelihood ratio testing. In all multivariate models, site was included as a fixed effect variable to adjust for potential geographic clinical differences.

Given the inherent clustering by provider in our study design, this study utilized the cluster option for logistic regression in STATA for the patient multivariate analysis. This process gives similar results as using a generalized estimation equation (GEE) approach (Coveney, 2004). GEE allows for the interpretation of comfort given a set exposure (independent variable) averaged across all providers without random effect distribution assumptions that are inherent to mixed effect models (Hubbard et al., 2010).

The final model of patient comfort incorporated all eligible independent variables from bivariate analysis plus pre-determined demographic variables while controlling for site as a fixed effect and clustering by provider.

Multivariate Analysis of Provider Comfort:

Again, a base model of the relationship of each independent variable to high provider comfort while adjusting for site was created (base model, column 1, table 4). Creation of the final multivariate model of provider comfort utilized the same methods in model development as in the patient model for variable selection. However, as the provider was the unit of analysis, this model did not requiring clustering by provider. Again, site was included as a fixed effect variable.

All analyses were conducted on STATA version 11.0 (StataCorp, 1985/2009).

3. RESULTS

Original Study Sample:

From 2007-2008, study personnel contacted 47 of the 55 identified eligible providers with 45 agreeing to participate and two refusing (one for discomfort with audio-recordings, one for time constraints). As recruitment goals were met with 45 enrolled providers, no further attempts to enroll providers were made.

Study personnel identified 617 eligible patients during clinic visits occurring in 2006-2007. Provider discretion excluded 18 possible participants, often as the provider felt too rushed (n=12), the patient was too sick (n=5) or the visit was only for return of lab values (n=1). Of approached subjects (599), 434 consented to participate and completed the study (72%). The most common reason for refusal to participate was a lack of time to complete the interview (106 individuals).

For the current analysis, 21 additional patients were excluded; 17 for missing or incomplete audio-recordings, three for wholly missing substance use data, and one for missing demographic data, leaving a final analytic sample of 413 encounters (see figure 1). Additionally, one provider was excluded as they only had a single patient participate in the study (final provider n=44).

Participant Characteristics:

The patient study sample was mostly male (65%), African-American (59%), with a mean age of 45 years (standard deviation (s.d.) = 9.3, range 20-77 years). The majority were on antiretroviral therapy (77%) with their last CD4 count > 200 (80%). Current drug use was reported by 27% of patients, with 9.5% reporting current problematic alcohol use. One third did not complete high school or obtain an equivalent degree. Clinical data

was missing for 8 patients regarding antiretroviral use and 15 patients for last CD4 count. Additional patient demographics are given in Table 1.

Bivariate Associations of High Patient Comfort:

In bivariate analysis (Table 1) high patient comfort discussing substance use was inversely related to current drug use and current problematic alcohol use. Only 56% of current problematic drinkers reported high comfort compared to 78% of non-problematic or non-drinkers (X^2, p=0.003). Two-thirds of patients with current drug use report high comfort compared to 79% of patients without current drug use (X^2, p=0.005).

Patients with high self-efficacy for communication skills also reported high comfort (84%) more often compared to those with lower self-efficacy (64%) (X^2 p=<0.001). Being on antiretroviral medications (ARVs) was strongly associated with high comfort, 80% of medicated participants reported high comfort compared to 65% of patients not on ARVs (X^2 p=0.003).

Mantel-Haenszel testing was used to assess for homogeneity of bivariate associations across provider and did not indicate the need to stratify bivariate results by provider (Table 1, final column).

Multivariate Associations of High Patient Comfort:

Table 2 presents multivariate associations of high patient comfort discussing substance use after controlling for patient and provider race and gender and all additional variables presented in table 2.

A patient reporting current drug or problematic alcohol was less likely to endorse high comfort discussing substance use with their provider (aOR=0.46, 95% CI: 0.28--

0.77 for drug use, aOR=0.32, 0.15--0.66, for alcohol use) after adjusting for demographics, education, self-efficacy, patient activation, depression and ARV status.

A patient on ARVs had twice the odds of reporting high comfort compared to a patient not on ARVs (aOR=2.15, 95% CI: 1.18-3.40)). Patients who did not graduate high school were half as likely to report high comfort compared to graduates (aOR=0.45, 95% CI: 0.22--0.93).

The highest tier of patient activation was positively associated with increased odds of reporting high comfort (aOR=2.66, 95% CI: 1.24--5.69) after controlling for substance use, education level, self-efficacy and demographics. Also, each 10-minute increase in the length of the patient's office visit was associated with nearly a quarter decrease in the odds of patient comfort (aOR=0.78, 95% CI: 0.64--0.99). There were no provider-level characteristics associated with patient comfort discussing substance use from multivariate modeling.

A sensitivity analysis limiting the final multivariate model of patient comfort to only those with current drug or alcohol use yielded similar results, though there was insufficient power to detect a difference in self-efficacy or patient activation due to the smaller sample size.

Provider Characteristics:

Table 3 presents characteristics of the provider sample. The sample of providers was evenly split by gender (female (57%), male (43%)) with majority white race/ethnicity (68%) and a mean age of 44 years (s.d.=8.6). Three-quarters of the providers were physicians (77%). Less than half (41%) worked more than 20 hours a

week taking care of HIV-infected patients. Only 27% reported high stress and 47% felt the day of the patient visit was "Very Busy". See Table 3 for further characteristics.

Bivariate Associations with High Provider Comfort:

High provider comfort discussing substance use with their patients was reported by all midlevel providers compared to 65% of physicians. The average age of the provider differed significantly between providers endorsing high comfort (mean = 46 years, s.d.=8.7)) compared to those not endorsing high comfort (mean=40 years, s.d. 6.6, 2-sided t-test, *p*=0.025).

Provider practice characteristics associated with provider comfort included the proportion of patients with a high school degree. Providers reporting high comfort have a higher proportion of patients with a high school degree (75% versus 62%, 2 sided t-test p=0.015); they also have fewer patients on anti-retroviral therapy (74% versus 85%, 2 sided t-test, p=0.059).

Multivariate Analysis of Provider Comfort:

Given the absence of any midlevel provider reporting less than high comfort this variable was not able to be included in multivariate logistic regression. The final multivariate model did not observe any associations between provider characteristics and provider comfort after adjusting for provider and patient characteristics including provider and patient demographics (see Table 4).

However, as a provider's proportion of patients on ARV increased, the odds of a provider reporting high comfort discussing substance use decreased (aOR: 0.38, 95% CI: 0.15 -- 0.97). As the proportion of patients in the highest patient activation tertile

increased, so did the odds of a provider reporting high comfort discussing substance use

(aOR 2.87, 95% CI: 1.01-8.14). These associations control for patient and provider

demographics, provider stress, patient education level, ARV status, patient activation and

site.

Comfort and the Mention of Substance Use during the Office Visit:

In bivariate analysis neither patient nor provider comfort discussing substance use

was associated with the mention of substance use during the office visit (Table 5).

Multivariate analysis did not change the direction or magnitude of the bivariate

associations between comfort and the mention of substance use.

4. DISCUSSION

Summary of Findings with Comparisons to Previous Work

Patient Comfort: The majority of patients and providers reported high comfort discussing substance use. As hypothesized, patients with current drug or alcohol use were less likely than their non-using peers to be comfortable discussing substance use with their provider. Additionally, patients without a high school diploma or GED were half as likely to report high comfort discussing substance use compared to a someone with a high school diploma or higher, even after accounting for current substance use, depression, and demographics.

In the patient comfort multivariate analysis, being female, being on ARVs, having the highest level of communication self-efficacy and high patient activation were all independently associated with high patient comfort. However, for each 10-minute increase in the length of the patient-provider, visit the odds of patient comfort decreased by nearly a quarter. This analysis failed to identify any statistically significant associations for the possible role of provider characteristics on patient comfort discussing substance use.

Comfort discussing substance use is a novel question without previous work in the literature. While the majority of our patient sample reported high comfort, our findings suggest that HIV-infected individuals with current drug or alcohol use are less comfortable discussing this use with their providers. Of all patients reporting less than high comfort discussing substance use, 38% had used drugs in the past month and 17% had drank alcohol to intoxication in the past month. Thus, the patients with the most need to discuss substance abuse were the least likely to report high comfort doing so.

Though this study is not directly about communication behaviors, rough comparisons between constructs of comfort discussing substance use and communication behaviors may be made. Previous work from the ECHO study found that the quality of communication differs for patients with current problematic drinking and illicit drug use (Korthuis et al., 2010). They observed poorer overall communication for current problematic drinkers but equivalent or better communication for individuals with current drug use compared to non-users. This may reflect inherent differences in these groups in regards to communication behaviors or the quality of the patient-provider relationship, as visit lengths were shorter for current alcohol users but not drug users. In this analysis, patients with current problematic drinking and those with current drug use had decreased odds of high comfort discussing substance use but we did not assess for interactions between these two groups nor did we assess for differences in visit length for drug versus alcohol users.

This study observed an inverse relationship between patient comfort and visit length. This may reflect the complex nature of the patient's health (i.e., worse HIV-related health, lower health literacy or active drug use), which takes longer to address. Also, a longer visit may reflect a provider's inability to successfully address substance use and thus reflect poorer quality of communication. Most likely, the longer visit lengths and decreased odds of patient comfort may reflect that these discussions are inherently uncomfortable and take longer to have in the office visit.

The strong association between less educational attainment and decreased odds of high comfort likely captures the greater health disparities experienced by individuals of lower socioeconomic status (Shavers, 2007).

This study did not identify any provider-level characteristics associated with patient comfort. This contrasts the findings of Wilson and Kaplan Wilson 2000, who investigated patient-rated communication of their HIV provider. Their study found that patients rated the quality of general and HIV-related communication higher for providers who were female or homosexual and these providers possessed effective communication skills to discuss difficult topics such as substance use. Conceptually patients may be more comfortable discussing their substance use if they have a female provider. In this study, there was no difference between male and female providers and patient reported comfort. This may reflect the difference between provider communication skills and patient comfort, as a skilled provider may be best at discussing these topics with all patients, comfortable or not. Unfortunately, this dataset did not include information on provider sexual orientation.

Provider Comfort: In the multivariate analysis of provider comfort, the final model failed to identify any associations between provider comfort and provider-specific characteristics. However, when investigating characteristics of the provider's patient sample there was an inverse association between the proportion of patients on ARV and provider comfort and a positive association between comfort and the proportion of patients with the highest level of patient activation.

Provider comfort discussing substance use is a novel research question without previous research on this specific topic. Related literature comes from patient-reported scoring of provider performance in the realms of general and HIV-specific

communication (Sullivan, Stein, Savetsky, & Samet, 2000), (Roter & Hall, 2004) (Wilson & Kaplan, 2000).

From Roter and Hall's systematic review of gender and patient-centered communication, one would hypothesize that female providers would report greater comfort discussing substance use (Roter & Hall, 2004). In Wilson and Kaplan, patient-rated communication skills were higher for female providers (Wilson & Kaplan, 2000).

This current study did not observe any association between provider gender and comfort. This may reflect the difference between overall provider comfort discussing substance use and the comfort of conversations with each patient, which this study did not aim to investigate. Most likely this difference is in the nature of the previous work, patient-reported scores of provider performance may not actually reflect how the provider feels in their abilities or comfort with a topic.

The inverse relationship between provider comfort and anti-retroviral status could possibly be explained if ARV status was a marker of disease status. However, in this study sample, there was no difference in mean CD4 count between those on or off antiretroviral medications (*2-sided t-test,* p=0.129). The observed independent relationships between provider comfort and the proportion of patients on antiretroviral medications and high patient activation may reflect perceived similarities on the part of the physician, which facilitate communication with their patients.

As this analysis is the first to formally survey provider comfort discussing substance use with their patients these observations serve as hypothesis generators for future research to increase provider discussions on substance use with their HIV infected patients.

Comfort and Mention of Substance Use: This analysis failed to observe an association between patient or provider comfort discussing substance use and any mention of substance use at the office visit in bivariate and multivariate analysis.

Less than half of the patients in the sample experienced an office visit where substance use was mentioned; this is consistent with earlier works (Korthuis et al., 2008). Not only are these discussions happening infrequently, at the time of this analysis, a discussion was coded as occurring if substance use was ever mentioned in the office visit. Therefore this variable cast a wide net to catch any possible discussion on substance use. The absence of any association between comfort and discussion likely reflect the wide-ranging nature of discussions regarding substance use in this sample and how comfort is not the sole determining factor in a patient or provider decision to discuss substance use.

Metsch and colleagues (Metsch et al., 2008) reported that patients with poor self-reported general health were more likely to report discussions on their alcohol use in the past six months. Our closest marker of HIV-related health, CD4 count, was not associated with patient comfort discussing substance use in bivariate analysis nor was the proportion of patients with low CD4 counts associated with provider comfort. Also, Metsch's findings may reflect provider-initiated discussions of substance use triggered by the patient's poor HIV health status as opposed to comfort of patient or provider per se.

Implications:

Clinical:

       This research supports efforts in encouraging medical providers to regularly discuss substance use with their HIV-infected patients as the patients most likely to benefit from discussions are the least likely to report comfort discussing their use.

       Specifically, the "SBIRT" model (Screening, Brief Intervention, Referral, and Treatment) is well established as a feasible method to improve patients reported drinking behaviors that can easily be incorporated into office setting (Madras et al., 2009). Physician discussions of substance use are beneficial to patients by improving ARV adherence, engaging more often in routine primary care and decreasing hospital utilization along with improvement of common medical illnesses impacted by substance use (Turner, Laine, Cosler, & Hauck, 2003), (Messeri, Abramson, Aidala, Lee, & Lee, 2002) (Kapadia et al., 2008).

       Additionally, this work observed independently increased odds of comfort for both patients with higher patient activation and higher communication self-efficacy. Increasing these elements are components of the patient-centered communication movement. Efforts to encourage these behaviors may increase comfort and engagement in care.

Public Health Practice and Policy:

       Drug and alcohol use is not a problem exclusive to the HIV-related community, nor with strictly bio-medical implications. Substance use impacts the individual, their family, their community and even their environment; all facets of the public health realm.

Current drug or alcohol use is associated with increased HIV transmission behaviors (Turner et al., 2001), which is of clear public health importance. Expanding access to drug and alcohol treatment, while clearly important from the medical standpoint, also improves the public's health.

Additionally, this study observed a strong negative association between lack of educational attainment (not receiving a high school diploma or GED) and the odds of high comfort discussing substance use. Educational attainment is a known proxy for socioeconomic status in American society (Shavers, 2007). Public health aims to reduce or eliminate the health disparities in society and one method may be through efforts to graduate high school.

Future Research:

The negative impacts of drug and alcohol use on the health of individuals with HIV are well established, as are the benefits for drug and alcohol treatment. How the link is made to obtaining substance use treatment often falls in the hands of medical providers. Efforts to assess why providers are or are not comfort discussing substance use and studies which analyze the patient-physician dyad (why is this patient-physician pairing comfortable compared to that same physician with a different patient) may improve the access HIV infected patients with current drug or alcohol use get the treatment they need by better informing providers of the specific patients they tend to overlook and not discuss substance use with routinely.

Clearly, comfort discussing substance use is a concept in its infancy. Future research would also benefit from pilot testing questions on comfort for psychometric

validation for reliability and consistency across study samples. Afterwards, research on comfort discussing substance use could involve the characterization of comfort over time, as a relationship with a provider develops or as patient's involvement with drugs or alcohol changes.

Strengths and Limitations:

As the largest study to date on patient or provider comfort discussing substance use, these findings serve as hypothesis generating observations from which to base future research. Comfort is a novel concept with scant data in the literature. This study utilized a novel question for both patients and providers to assess overall comfort discussing substance. Clearly, this question warrants psychometric validation. However, in this analysis if comfort was simply a proxy for patient self-efficacy or patient activation then one would have expected these bivariate associations to lessen or disappear with multivariate modeling, this was no observed.

Also, comfort was asked at one time, after a single visit with a provider. Comfort may be a dynamic concept that ebbs and flows across the duration of the relationship and is not simply a linear relationship with duration. As our study reflects one office visit and self-reported comfort at one moment in time they may not reflect typical office visits.

Providers were asked for their overall comfort discussing substance use with all patients. A better method of assessing the importance of characteristics of the dyad would be to assess provider comfort with each patient.

Of the 599 patients approached by study staff, 28% refused, most often as the patient was rushed. This is likely a source of non-differential selection bias and would likely bring our observed estimates closer to the null.

The small number of providers is likely the greatest limit to our provider multivariable analysis in regards to the power. While the original study was sufficiently powered to detect differences in patient-level characteristic, this secondary analysis opted to investigate provider-level differences as well. Furthermore in the provider comfort analysis one additional provider was excluded for having only one enrolled patient, thus leaving the provider sample with 44 individuals further decreasing an already small sample.

However, this exclusion allowed the inclusion of practice characteristics (the proportion of patients data) into multivariable analysis, which allowed for analysis of patient-level characteristics and their impact on provider comfort. This provided a unique strength of this analysis, patient impacts on the provider an angle often overlooked in the literature. The absence of data on provider sexual orientation limited our ability to investigate known associations of patient-provider communication.

The investigation into the mention of substance use during the patient-provider visit and patient or provider comfort did not identify any association, as one may not exist. However, this variable is most likely limited in its construct. While this measurement does capture all mentions of substance use, it does not distinguish between a discussion and a simple question initiated by the patient or the provider, nor does it reflect the tone or content of this mention. This variable reflects such a wide range of events that finding an association to a single question is unlikely.

Finally, this cross-sectional study reflects associations at one moment in time and cannot be used to infer causality. Finally, the study duration of one year is unlikely to be

subject to temporal changes as there were no major changes to the standard of care in the

HIV outpatient treatment setting.

5. SUMMARY AND CONCLUSIONS:

HIV-infected patients who are currently using drugs or alcohol, have lower educational attainment, or are not on antiretroviral medications are less likely to report high comfort discussing substance use with their provider. Patients with high communication self-efficacy and patient activation are more likely to have high comfort even after controlling for current substance use, depression, and demographics. Thus, patients with the most need to discuss substance abuse were the least likely to report high comfort doing so, yet have a potential benefit from discussions regarding their substance use.

Highly activated patients or those with high communication self-efficacy are engaged in their care and likely to feel self-empowered to make changes in their health. This is consistent with the observed positive relationship between patient activation and comfort. Efforts to increase patient-centered communication and patient engagement in their care may increase their comfort discussing substance use with their provider.

This study found associations between characteristics of the panel of patients a provider sees and provider comfort. Specifically, patient panels with high patient activation and ARV status were independently associated with provider comfort. If a provider sees a majority of patients with high activation, they may feel more comfortable discussing substance use as their patients are possibly bringing up the topic or they know their patients have the skill set to try and make changes in their substance use.

Comfort was not associated with the discussion of substance use at the office visit. While comfort may be a characteristic of the patient or the provider, it is likely not

the sole impetus for discussions, which likely reflect a complicated scenario of patient-

provider characteristics and may not be easily assessed at a single office visit.

6. FIGURES AND TABLES

Figure 1.

617 Eligible Patient Visits
2006-2007

18 Excluded at Provider Discretion
•Provider too rushed (12)
•Provider felt patient too sick (5)
•Provider only returning lab values (1)

599 Patients Approached by Study Staff

165 Refused (28%)

434 Consented to Participate

21 Excluded at Data Analysis
•Missing or incomplete audio-recordings (17)
•Entirely missing substance use data (3)
•Entirely missing demographic data (1)

Table 1: Patient Participant Descriptors and Bivariate Associations with High Patient Comfort Discussing Substance Use. *P-values for categorical variables calculated using chi-squared tests, while two-sided t-test was utilized for continuous variables.*

	Overall n(%) or mean (sd) range	PATIENT COMFORT		χ2 or t-test *p*-value	Mantel-Haenszel Test *p*-value
		Less than High n(% or SD)	High Comfort n(% or SD)		
OVERALL	413 (100)	100 (24)	313 (76)	-	-
Patient Characteristics					
Gender Female Male	146 (35) 267 (65)	41 (28) 59 (22)	105 (72) 208 (78)	0.175	0.474
Race Non-Hispanic White African-American Hispanic Other	99 (24) 244 (59) 58 (14) 12 (3)	28 (28) 54 (23) 14 (24) 2 (17)	71 (72) 188 (77) 44 (76) 10 (83)	0.687	0.242
Mean Age (years) (Range: 20-77)	45 (9.3)	45 (9)	46 (10)	0.488	0.981
High School Diploma or GED No Yes	118 (29) 295 (71)	23 (19) 77 (26)	95 (81) 218 (74)	0.152	0.101
Employed No Yes	307 (75) 105 (25)	76 (25) 24(23)	231 (75) 81 (77)	0.695	0.824
CES-D Depression Tertiles Lowest Middle Highest	160 (39) 124 (30) 129 (31)	26 (16) 38 (31) 36 (28)	134 (84) 86 (69) 93 (72)	0.010	0.340
On Antiretroviral Therapy No Yes	91(22.5) 314(77.5)	32 (35) 63 (20)	59 (65) 251 (80)	0.003	0.7685
CD4 Count ≥200 No Yes	80 (20) 318 (80)	19 (24) 73 (23)	61 (76) 245 (77)	0.880	0.2926
Current Problematic Alcohol Use No Yes	373 (90.5) 39 (9.5)	83 (22) 17 (44)	290 (78) 22 (56)	0.003	0.379
Any Current Drug Use No Yes	300 (72.8) 112 (27.2)	62 (21) 38 (34)	238 (79) 74 (66)	0.005	0.4953
High Communication Self-Efficacy No Yes	161 (39.2) 250 (60.8)	58 (36) 41 (16)	103 (64) 209 (84)	<0.001	0.264

Patient Activation Tertiles					
Low	146 (35.3)	48 (33)	98 (67)	0.001	0.859
Medium	144 (34.9)	35 (24)	109 (76)		
High	123 (29.8)	17 (14)	106 (86)		
Patient Duration with Provider					
< 5 years	273 (66.3)	66 (24)	207 (76)	0.949	0.193
≥5 years	139 (33.7)	34 (24)	105 (76)		
Mean Visit Length In Minutes	24 (12)	27 (13.5)	23 (11.2)	0.009	0.436
Provider Characteristics					
Gender					
Male	177 (42.9)	47 (27)	130 (73)	0.336	N/A
Female	236 (57.1)	53 (22)	183 (78)		
Race					
Non-White	121 (29.3)	32 (26)	89 (74)	0.495	N/A
White	292 (70.7)	68 (23)	224 (77)		
Mean Age of Provider	44 (8.2)	45 (8.2)	44 (8.2)	0.413	N/A
Type of Clinician					
Physician	299 (72.4)	80 (27)	219 (73)	0.051	N/A
Mid-level Provider (RN, NP, PA)	114 (27.6)	20 (18)	94 (82)		
Time Caring for HIV Patients (hrs/wk)					
≤20	215 (52.1)	47 (22)	168 (78)	0.245	N/A
>20	198 (27.9)	53 (27)	145 (73)		
High Stress					
No	293 (70.9)	70 (24)	223 (76)	0.811	N/A
Yes	120 (29.1)	30 (25)	90 (75)		
High Physician Busyness					
No	253 (64.2)	61 (24)	192 (76)	0.875	N/A
Yes	141 (35.8)	33 (23)	108 (77)		
Communication Training					
No	137 (33.2)	41 (30)	96 (70)	0.056	N/A
Yes	276 (66.8)	59 (21)	217 (79)		
High Confidence in Prevention Conversations					
No	320 (77.5)	80 (25)	240 (75)	0.489	N/A
Yes	93 (22.5)	20 (22)	73 (78)		
High Provider Comfort Discussing Substance Use					
No	116 (28.1)	26 (22)	90 (78)	0.594	N/A
Yes	297 (71.9)	74 (25)	223 (75)		

Table 2. Multivariate Associations of High Patient Comfort

Multivariate Model A reports the odds of high comfort for each independent variable while controlling for site and provider clustering. The Final Model includes all variables, as well as site and adjustment for provider clustering.

Correlates	Base Model Adjusted bivariate OR (95% CI)	*p*-value	Final Model OR (95% CI)	*p*-value
Patient Variables				
Gender:				
Male	1.0	0.192	1.0	0.018
Female	1.38 (0.85-2.25)		2.05 (1.13-3.72)	
Race:				
White	1.0		1.0	
African-American	1.40 (0.88-2.24)	0.480	1.29 (0.67-2.42)	0.735
Hispanic	1.30 (0.53-3.19)		1.25 (0.41-3.76)	
Other	2.03 (0.44-9.39)		2.54 (0.36-17.96)	
Education:				
Less than High School Diploma	0.67 (0.37-1.24)	0.202	0.45 (0.22-.93)	0.031
Depression Tertile				
1	1.0	0.005	1.0	0.201
2	0.45 (0.27-0.73)		0.65 (0.39-1.07)	
3	0.51 (0.29-0.91)		0.89 (0.49-1.61)	
On ARV (Reference=no)	2.15 (1.36-3.40)	0.001	2.33 (1.18-4.6)	0.015
Current Problematic Alcohol Use (Reference=no)	0.32 (0.15-0.66)	0.002	0.33 (0.15-0.72)	0.006
Current Drug use (Reference=no)	0.46 (0.28-0.77)	0.003	0.52 (0.29-0.93)	0.028
High Communication Self-Efficacy	2.90 (1.72-4.89)	<0.001	1.96 (1.08-3.54)	0.025
PAM Tertile				
1	1.0	<0.001	1.0	0.037
2	1.56(0.95-2.57)		1.55 (0.81-2.95)	
3	3.12 (1.84-5.32)		2.66 (1.24-5.69)	
Length of Visit (Odds for a 10 minute increase)	0.75 (0.61-.92)	0.006	0.78 (0.64-0.99)	0.015
Provider Variables				
Gender				
Male	1.0	0.545	1.0	0.314
Female	1.19 (.67-2.12)		1.41 (.72-2.74)	
Race				
White	1.0	0.611	1.0	0.927
Non-White	1.14 (0.69-1.90)		1.03 (0.57-1.87)	
Type of Provider				
Physician	1.0	0.70	1.0	0.087
Midlevel	1.91 (0.95-3.84)		2.17 (0.89-5.27)	
Communication Training				
No	1.0	0.156	1.0	0.859
Yes	1.49 (0.86-2.60)		0.94 (0.50-1.78)	

Table 3: Provider Sample Descriptors and Bivariate Associations with High Provider Comfort Discussing Substance Use.

P-values for categorical variables calculated using chi-squared test (except (**) as Fischer's Exact Test for low expected cell value was used) and a 2-sided t-test was utilized for continuous variables.

	N(%)	PROVIDER COMFORT		p-value
		Less than High Comfort Discussing Substance Use with Patients n(% or SD)	High Comfort Discussing Substance Use with Patients n(% or SD)	
OVERALL	44 (100)	12 (**)	32 (**)	-
Provider Characteristics				
Gender Male Female	19 (43) 25 (57)	5 (26) 7 (28)	14 (74) 18 (72)	0.901
Race Non-White White	14 (31) 30 (68)	5 (36) 7 (23)	9 (64) 23 (77)	0.390
Mean Age of Provider	44 (8.6) (30-64)	40 (6.6)	46 (8.7)	0.032
Type of Clinician Physician Midlevel Provider (RN, NP, PA)	34 (77) 10 (23)	12 (35) 0 (0)	22 (65) 10 (100)	0.041 **
Time Caring for HIV Patients (hrs/wk) ≤20 >20	26 (59) 18 (41)	9 (35) 3 (17)	17 (65) 15 (83)	0.303 **
High Stress No Yes	32 (73) 12 (27)	7 (22) 5 (42)	25 (78) 7 (58)	0.189
High Physician Busyness No Yes	22 (51) 21 (49)	8 (36) 4 (19)	14 (64) 17 (81)	0.310 **
Communication Training No Yes	16 (36) 28 (64)	5 (31) 7 (25)	11 (69) 21 (75)	0.654
High Confidence in Prevention Conversations No Yes	35 (80) 9 (20)	11 (31) 1 (11)	24 (69) 8 (89)	0.405 **
PRACTICE CHARACTERISTICS *(Proportions of patients)*	mean (sd)			
Female Patients	0.363 (0.19)	0.36 (0.2)	0.37 (0.2)	0.900
Non White Patients	0.769 (0.20)	0.74 (0.19)	0.78 (0.21)	0.546

Age ≥ 45 yrs	0.55 (0.22)	0.56 (0.19)	0.55 (0.23)	0.925
High School Degree	0.72 (0.17)	0.62 (0.17)	0.75 (0.15)	0.015
Currently Full or Part Time Employed	0.25 (0.16)	0.20 (0.18)	0.27 (0.15)	0.228
Highest Depression Tertile	0.31 (0.14)	0.32 (0.16)	0.30 (0.14)	0.707
On Anti-Retrovirals	0.77 (0.18)	0.85 (0.17)	0.74 (0.17)	0.059
CD4 count <200	0.20 (0.12)	0.24 (0.12)	0.19 (0.12)	0.188
Current Problematic Alcohol Use	0.09 (0.13)	0.12 (0.11)	0.08 (0.13)	0.386
Current Drug Use	0.26 (0.17)	0.27 (0.16)	0.26 (0.18)	0.864
High Communication Self-Efficacy	0.61 (0.19)	0.58 (0.16)	0.62 (0.20)	0.583
Highest Tertile of Patient Activation	0.31 (0.16)	0.25 (0.18)	0.33 (0.15)	0.184
Patients Reporting Knowing Provider ≥ 5 years	0.33 (0.27)	0.23 (0.22)	0.37 (0.27)	0.129
Patients with a Visit Length >22minutes (the median length)	0.49 (.32)	0.55 (0.36)	0.47 (0.31)	0.489
High Patient Comfort	0.78 (0.17)	0.77 (0.12)	0.77 (0.19)	0.857

Table 4: Multivariate Associations of High Provider Comfort:

Correlates	CRUDE OR	Base Model Bivariate assocs. Controlling for site (aORs)	Final Model* (aORs)	*p*-value
Gender Male Female	1.0 0.92 (0.24-3.52)	1.0 1.12 (0.28-4.56)	1.0 1.42 (0.10-19.39)	0.792
Provider Race Non-Caucasian Caucasian	1.0 1.82 (0.46-7.28)	1.0 2.67 (0.52-13.78)	1.0 1.49 (0.11-19.93)	0.765
Mean Age of Provider	1.10 (1.00-1.21)	1.10 (1.00-1.22)	1.08 (0.94-1.23)	0.290
Highest Stress Group	0.39 (0.09-1.62)	0.39 (0.09-1.68)	0.40 (0.04-3.70)	0.418
Practice Characteristics (10% change in Proportion^)				
Female Patients	1.02 (0.72-1.45)	1.05 (0.70-1.56)	1.60 (0.87-2.96)	0.130
Non-white Patients	1.11 (0.80-1.53)	1.15 (0.78-1.68)	1.79 (0.86-3.76)	0.121
Patients with a High School Degree	1.75 (1.08-2.84)	1.96 (1.09-3.54)	2.40 (0.96-5.97)	0.061
Patients On ARV	0.67 (0.43-1.03)	0.67 (.43-1.04)	0.38 (0.15-0.97)	0.043
Patients in the Highest Tertile PAM	1.35 (0.87-2.11)	1.40 (0.86-2.26)	2.86 (1.01-8.14)	0.048

***Final model includes all correlates and controls for site.
^Odds Ratios reflect a change in 10% of the proportion of patients with a given characteristic.

Table 5: Comfort and the Mention of Substance Use in Office Visit

	Mention of SU Bivariate (OR (95% CI))	p-value	Mention of SU Multivariate* (OR (95% CI))	p-value
Patient Comfort				
Less than High	1.0	0.762	1.0	0.455
High	0.93 (0.59-1.47)		1.24 (0.70-2.20)	
Provider Comfort				
Less than High	1.0	0.793	1.0	0.891
High	1.05 (0.71-1.57)		0.97 (0.64-1.46)	

Multivariate model controls for patient CD4<200, patient current drug use, provider race, duration of office visit, site and interpersonal trust. Based on the work of Maier et al (Korthuis, et al 2011, personal communication).

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