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Correlates of Self-efficacy to Disclose Injection Drug Use to HIV Primary Care Providers Among a Sample of HIV Seropositive Injection Drug Users

Yves Jeanty
University of Miami, yvesjeanty@gmail.com

UNIVERSITY OF MIAMI

CORRELATES OF SELF-EFFICACY TO DISCLOSE INJECTION DRUG USE TO HIV PRIMARY CARE PROVIDERS AMONG A SAMPLE OF HIV SEROPOSITIVE INJECTION DRUG USERS

By

Yves Jeanty

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Yves Jeanty

Approved:

_____
Clyde B. McCoy, Ph.D.
Professor and Chair Emeritus
Epidemiology and Public Health

_____
Terri A. Scandura, Ph.D.
Dean of the Graduate School

_____
Margaret Pereyra, Dr.P.H.
Research Assistant Professor of
Epidemiology and Public Health

_____
Lisa R. Metsch, Ph.D.
Professor of Epidemiology and
Public Health

_____
David Purcell, J.D., Ph.D.
Chief, Prevention Research Branch
Division of HIV/AIDS Prevention
Centers for Disease Control and Prevention
Atlanta, Georgia

_____
James D. Wilkinson, M.D., M.P.H.
Professor of Pediatrics

JEANTY, YVES (Ph.D., Epidemiology)

Correlates of Self-efficacy to Disclose Injection Drug Use to HIV Primary Care Providers Among a Sample of HIV Seropositive Injection Drug Users. (August 2011)

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This dissertation sought to identify correlates of perceived self-efficacy to disclose drug use to one's HIV primary care provider (DISDR) among a sample of HIV-positive injection drug users (IDUs). Additionally the relationship between identified correlates and DISDR was evaluated to determine whether it persists longitudinally. Potential correlates consisted of individual characteristics (socio-demographic), health care service utilization, sex/drug use behaviors, and psychosocial characteristics. It was postulated that selected variables from these domains would be associated with DISDR. This study presents baseline and longitudinal data that suggest a positive association between self-efficacy to disclose injection drug use to one's HIV primary care provider and the following variables: patient-provider relationship, attendance of a drug treatment program during the previous six months, "taking control of one's healthcare," and social support. However, current receipt of HIV medications and being recruited from the city of Miami were negatively associated with reporting a high DISDR. These findings will potentially inform interventions that can improve HIV treatment among drug users and inform policymakers and stakeholders regarding the importance of providing comprehensive HIV care in conjunction with substance abuse treatment options to achieve optimal health outcomes. A recommendation for further study is enclosed.

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Chapter 1. Introduction

1.1 General overview

Since the inception of the AIDS epidemic in the United States, injection drug use has played a role in driving new infections. In 2007, injection drug use was the third most frequently reported risk factor for HIV infection in the United States, after male-to-male sexual contact and high-risk heterosexual contact. During 2004-2007, researchers at the Center for Disease Control (CDC) analyzed data from 34 states participating in confidential, name-based HIV surveillance and reported that a total of 152,917 persons received a diagnosis of HIV infection, including 19,687 (12.9%) injection drug users (IDUs). The majority of HIV-infected IDUs (62.2%) were male. By age group, the highest percentage of HIV diagnoses among IDUs (33.2%) was observed among persons aged 35-44 years. By race/ethnicity, blacks accounted for 11,321 (57.5%) of HIV-infected IDUs, whites for 4,216 (21.4%), and Hispanics or Latinos for 3,764 (19.1%)(1).

The range of care available for individuals infected with HIV has been markedly expanded with the development of antiretroviral therapy (ART). Strict adherence to prescribed ART have been shown to decrease viral load to undetectable levels both in blood plasma and semen samples leading to overall decreases in hospitalization, cost, morbidity and mortality in HIV positive persons (2-4). Adherence at levels below 95%, is predictive of almost two-fold increase in hospitalizations among antiretroviral naïve patients commencing an ART regimen (5).

Treatment of HIV disease among IDUs can be very successful (6), however, HIV seropositive IDUs often present with additional treatment challenges that need to be addressed such as co-morbidities, barriers to HIV primary care, ongoing injection drug use, ART therapy and illicit drug interactions and side effects (7-12). In order to prescribe and then monitor the appropriate HIV treatment regimens, one of the necessary conversations that patients should have with their HIV primary care providers is that of current drug use and possible attendance at a substance abuse treatment program. Methadone and other opioid agonists such as Naltrexone or Buprenorphine, used as part of a substance abuse treatment program, can interact with prescribed regimens to adversely affect HIV treatment and even produce opioid withdrawal-like symptoms(13;14). Additional drug use-related complications include co-morbid bacterial and viral infections at frequent injection sites(13). The patient-provider relationship provides an important venue in the form of patient-centered care where patients and physicians can address treatment challenges and work together towards a mutual goal of optimal adherence(15;16). Within this context, this study seeks to identify correlates of HIV-positive injection drug users' self-efficacy to disclose injection drug use to their HIV primary care provider.

This study conducts a secondary analysis of cross sectional and longitudinal data that were collected as part of the CDC-funded multi-site study entitled "Intervention Research for HIV-positive Injection Drug Users" (INSPIRE)(17). The INSPIRE study was a five-year collaborative project (10/1999-5/2005) designed to develop, implement and test intervention strategies to address the primary and secondary intervention needs of HIV-

seropositive injection drug users (IDUs). The INSPIRE study was conducted in four cities, Baltimore, Atlanta, New York and Miami and this study represents one of the largest multi-site studies of HIV-positive injectors.

INSPIRE was a randomized controlled trial to evaluate a 10-session peer mentor intervention (PMI) that addressed the prevention and health care needs of HIV-positive injection drug users (17;18). Participants were assessed at baseline and then followed at three, six, and 12 months post baseline and were interviewed about their risky sexual and injection drug use behaviors, use of HIV primary medical care, and treatment adherence behaviors. The full methods will be presented in chapter 3.

1.2 Specific aims and hypotheses

The specific aims and hypotheses of this dissertation research represent cross-sectional analyses that were conducted on the INSPIRE baseline assessment as well as longitudinal analyses that were conducted with the follow-up assessments. This dissertation sought to answer three questions. The first question was what factors were associated with HIV-positive injection drug users' self-efficacy to disclose their drug use status to their HIV primary care providers (at baseline assessment). The potential correlates of HIV-positive drug users' perceived self-efficacy to disclose their drug use status to their providers consisted of individual characteristics (socio-demographic), health care services, sex/drug use behaviors, and psycho-social characteristics. Variables associated with these domains were selected because previous research has shown that correlates of perceived self-efficacy are not exclusively characteristics of an individual, but also include psychosocial

and environmental factors (19-21). The second question was to identify if the relationship between self-efficacy and correlates persists between baseline enrollment and subsequent follow up assessments. The third question was whether self efficacy was associated with the original study's primary outcomes of reduced sexual risk and injection behaviors, and use of HIV care (22). Below we present the three specific aims organized around these questions followed by the hypotheses.

Specific aim 1: To determine the association between self-efficacy to disclose drug use to one's HIV primary care provider (DISDR) and sociodemographic characteristics, HIV-care related characteristics, drug use related characteristics, and psychosocial characteristics at the baseline assessment.

HIV-care related characteristics:

Hypothesis 1.1: Participants self-reporting that they are "currently taking HIV medications" will report a higher DISDR when compared to participants self-reporting that they are not "currently taking HIV medications".

Hypothesis 1.2: Participants self-reporting a more positive "patient provider relationship" will report a higher DISDR than those reporting a more negative "patient provider relationship".

Hypothesis 1.3: Participants self-reporting a higher "taking control of healthcare" score will report a higher DISDR when compared to participants self-reporting a lower "taking control of healthcare" score.

Drug use related characteristics:

Hypothesis 1.4: Participants self-reporting "receiving any of the 3 substance treatment programs (hospital, outpatient, and methadone maintenance therapy (MMT)) in the past 6 months" will report a higher DISDR when compared to persons self-reporting no to "receiving any of the 3 substance treatment programs (hospital, outpatient, and MMT) in the past 6 months".

Psychosocial characteristics:

Hypothesis 1.5: Participants self-reporting a higher "social support scale" score, will report a higher DISDR when compared to participants self-reporting a lower "social support scale" score.

Specific aim 2: To determine the association between self-efficacy to disclose drug use to one's provider, and sociodemographic characteristics, HIV-care related characteristics, drug use related characteristics, psychosocial characteristics, and receipt of the intervention over the one year follow up period.

HIV-care related characteristics:

Hypothesis 2.1:

Participants self-reporting that they are "currently taking HIV medications" will report a higher DISDR when compared to participants self-reporting that they are not "currently taking HIV medications" over time.

Hypothesis 2.2: Participants self-reporting a more positive "patient provider relationship" will report a higher DISDR than those reporting a more negative "patient provider relationship" over time.

Hypothesis 2.3: Participants self-reporting a higher "taking control of healthcare" score will report a higher DISDR when compared to participants self-reporting a lower "taking control of healthcare" score over time.

Drug use related characteristics:

Hypothesis 2.4: Participants self-reporting "receiving any of the 3 substance treatment programs (hospital, outpatient, and MMT) in the past 6 months" will report a higher DISDR when compared to persons self-reporting no to "receiving any of the 3 substance treatment programs (hospital, outpatient, and MMT) in the past 6 months" over time.

Psychosocial characteristics:

Hypothesis 2.5: Participants self-reporting a higher "social support scale" score, will report a higher DISDR when compared to participants self-reporting a lower "social support scale" score over time.

Specific aim 3: To determine the relationship between self-efficacy to disclose drug use to one's provider, when controlling for sociodemographic characteristics, and changes in the INSPIRE primary outcomes of reduced sexual risk and injection behaviors, use of HIV care, and increased HIV treatment adherence.

Hypothesis 3.1: Participants self-reporting a high DISDR will report "no" to any unprotected vaginal or anal intercourse (NUUVA) with HIV-negative/unknown serostatus partners in the past three months at each follow up assessment when compared to participants self-reporting a low DISDR.

Hypothesis 3.2: Participants self-reporting a high DISDR will report "no" to any lending of needles (INJRISK) or shared drug paraphernalia with HIV-negative/unknown serostatus in the past three months at each follow up assessment when compared to participants self-reporting a low DISDR.

Hypothesis 3.3: Participants self-reporting a high DISDR will report "yes" to utilizing HIV care two or more times in the past six months at each follow up assessment when compared to participants self-reporting a low DISDR.

1.3 Study significance

The significance of this study is that it will identify correlates associated with self-efficacy to disclose injection drug use to one's provider using one of the largest national data sets of HIV positive injection drug users(17;22) Such findings will potentially inform positive changes to: 1) develop interventions that can improve the proportion of HIV IDUs that disclose their drug use to their HIV providers and thus potentially enhance the provider's ability to engage and retain IDUs in HIV primary care and 2) inform policymakers and stakeholders regarding the importance of providing comprehensive HIV care in conjunction with substance abuse treatment options to achieve optimal health outcomes.

The results of this dissertation research are responsive to the new national HIV/AIDS strategy, which was released in July, 2010. One of the major goals of this strategy is to improve the health care outcomes of persons living with HIV. Clearly, intervention strategies that can encourage the disclosure of drug use and improve the patient-providers interactions around drug use can increase the delivery of quality HIV care to HIV-positive injection drug users and potentially even reduce health care disparities (between drug users and non-drug users) which is another goal of the new national HIV/AIDS strategy.

Chapter 2. Background

Antiretroviral therapy (ART)

In the past 15 years, treatment advances have transformed HIV/AIDS from a rapidly fatal illness to a chronic disease(23;24). The advent and ready availability of antiretroviral therapy has led to the prescription of variable combination therapy medication regimens that fully suppress HIV, even among patients presenting with multi-drug resistant HIV(25). These regimens have been shown to decrease viral load to undetectable levels both in blood plasma and semen samples leading to marked decreases in costs(2), hospitalizations(3), morbidity and mortality in HIV positive persons(26-28). The success of HIV treatment has led to viewing HIV treatment as prevention as evidenced by the "test and treat" initiatives (29;30). The effectiveness of treatment in preventing new infections was supported by a recent study conducted by Montaner et al. 2010 which demonstrated a strong population-level association between increasing receipt of ART regimens and decreased viral load, and decreased number of new HIV diagnoses per year (31). Despite its potential for HIV prevention, effective implementation of ART requires rigorous adherence to a complex drug regimen and concurrent regular monitoring of CD4 and viral load count by an HIV primary care physician who will often adjust the drug combination to achieve the highest reduction in viral load and increase in T-cell count(13). Other chronic diseases such as hypertension or tuberculosis only require medication adherence rates of 80% to achieve disease suppression (26) while adherence levels above 95% are needed for ART to be fully effective. Furthermore, each drug potentially comprising the regimen is associated with specific side effects and when not taken as prescribed, can lead to the development of drug resistant strains of HIV(32;33).

Given the significance of optimal medication adherence in managing long term HIV infection, identifying less than optimally adhering populations, such as substance users, and addressing correlates of non-adherence is of paramount importance.

ART therapy among injection drug users

Treatment of HIV disease among IDUs can be very successful(6), however, HIV seropositive IDUs often present with unique treatment challenges that need to be addressed when creating a treatment plan. These challenges may include any of the following: (1) co-morbid medical and mental health conditions(26;34;35); (2) barriers to access and utilization of HIV primary care and non-adherence to medication regimen(28;36-38); (3) the need for substance abuse treatment, and possible drug interactions (e.g. ART and illicit drugs)(13;14;39-47) ; and (4) retention in care(8;22;48).

Understandably, there are challenges to be overcome in treating HIV disease among persons who are actively injecting drugs, however it remains the responsibility of the provider to not only initiate the discussion regarding possible substance abuse but to also be prepared to guide the patient into necessary treatment for their addiction.

DHHS antiretroviral treatment guidelines stress the active role of the HIV primary care provider in assessing co-morbidities, engagement and retention in care (2011). It is recommended that the first encounter with an HIV care provider include a comprehensive baseline evaluation and that "the evaluation must also include assessment of high-risk behaviors, substance abuse, social support, mental illness, co-morbidities, economic factors (e.g. unstable housing), medical insurance status and adequacy of coverage, and

other factors that are known to impair adherence to treatment and to increase the risk of HIV transmission" (49). However, recent research indicates that this suggestion is not being implemented as recommended in the guidelines. For example, a study conducted by Korthuis et al. assessed 951 HIV seropositive adults accessing HIV primary care at 14 HIV Research Network sites regarding alcohol use, drug use, substance abuse treatment and provider discussions of substance abuse issues. They found that although 71% of persons surveyed reported current or former illicit drug use, less than one quarter (24%) were receiving substance abuse treatment and less than half (46%) discussed substance abuse issues with their HIV care provider (50).

Provider mistrust among injection drug users

Patients who inject drugs may seek to hide these behaviors from clinicians out of fear of rejection, being judged, and possible legal implications(51). However, previous studies have shown that trust is critical in developing a good patient-provider relationship (39) and a lack of trust among IDUs may prevent them from revealing their drug use to their providers. A study conducted by Preau et al. (52) reported that a loss of trust in the patient-provider relationship is independently associated with dissatisfaction with medical staff's explanation of a diagnosis or prescribed treatment. Additionally, mistrust of HIV primary care providers has been shown to vary by race; Saha et al. conducted a study of 1305 African-American and White patients receiving care at an urban HIV clinic and found that African-Americans expressed significantly lower levels of trust in their providers (53). This erosion of trust is understandable as historically HIV providers were reluctant to prescribe ART to substance users, including injection drug users, on the basis

that they were perceived as being potentially less adherent to a medication regimen(54-57). A 1990 survey of 2,004 US physicians of various specialties (general internists, family physicians, and general practitioners) conducted by Gerbert et al. found that 55% expressed discomfort about having injection drug users in their practice(58). Bogart et al. conducted a pair of studies in 2000 and 2001 surveying infectious disease physicians regarding ART prescribing behaviors. The first study indicated that in prescribing ART, physicians strongly weighed non-medical patient factors including homelessness, injection drug use, and previous psychiatric hospitalization(56); the second study reported that physicians predicted that patients that were former injection drug users would be less likely to adhere to a prescribed medicine(55). Clinicians have consistently voiced concerns that incomplete adherence, due to a substance abusing lifestyle, could lead to the development of ART resistant virus strains, further infections and virologic failure(6;33;38;59). Of additional concern is that reluctance to prescribing ART to drug users may not be exclusive to physicians; Loughlin et al. reported that non-physician providers were 89% more likely than physicians to not prescribe ART to medically eligible injection drug users(54).

ART therapy efficacy among injection drug users

Recent studies, however, do not support these widely held fears about injection drug users not being able to adhere to their HIV treatment regiments. In 2010, Werb et al. published a meta-analysis of studies comparing ART resistance rates in IDUs and compared these rates to those among non-IDUs and persons infected via other routes of infection; they found that the risk of developing resistance to ART did not significantly

differ between IDUs and non-IDUs(60). Furthermore, a cross-sectional study of 1163 HIV-infected persons found that among ART users, those reporting past heroin use were just as likely to have an undetectable HIV viral load as persons reporting never having used heroin(61). Although IDUs have been shown to be as adherent to ART regimens as HIV-positive non-drug users, clinicians may still be reluctant to prescribe ART to substance users due to prejudices or a lack of experience in treating this population. These findings are supported by Ding et al. (59) who reported that seeing more IDUs, having higher HIV treatment knowledge scores and treating fewer patients per week were independently associated with more positive attitudes towards IDUs. Results from a survey of 40 experienced (over 10 years practice) HIV primary care physicians eliciting recommendations for improving drug users' adherence to ART reported the top recommendation as "establishing trust with the patient" (62). HIV primary care physicians should seek to engage the patient into regular care and cultivate a relationship with their substance abusing patients, which would allow them to build trust and better treat their concurrent diseases to promote retention and continuity of care (15;63;64).

Barriers to HIV primary care

Access to HIV primary care is the first step towards establishing a patient-centered treatment approach in which both patients and physicians work on establishing a mutually agreed upon regimen. Factors associated with poor access to HIV primary care among IDUs include the following: lack of medical insurance, ignorance regarding available therapy, actively injecting drugs, poor patient-provider relationship, lack of advanced disease, stigma and younger patient age(7;8;65;66). A study of HIV

seropositive injection drug users from INSPIRE conducted by Mizuno et al. found that health care utilization among HIV-seropositive drug users was significantly correlated with better engagement with health care providers, and having seen a case manager in addition to having health insurance(7). A longitudinal assessment also using INSPIRE was conducted by Wilkinson et al., who found that predictors of having a usual place of care over time were empowerment, utilization of case management and having a stable residence(8). Ultimately, lack of access to HIV primary care leads to undesired and preventable outcomes; for example, Lert et al. found that poorer outcomes in HIV-infected IDUs are correlated to increased rates of non-HIV deaths, lower adherence to care and treatment regimens, continuation of illicit drug use and negative life events (67;). Additional barriers to care include co-morbid mental illness(34-36), lack of stable housing and a lack of social support(68). These issues need to be addressed as part of a comprehensive treatment approach to improve adherence to prescribed ART regimens (69;70). Barriers to HIV primary care impede the ability of HIV positive IDUs to be "engaged" with their treatment. In this context, the term "engaged" refers to patient involvement in the spectrum of patient care, ranging from initial diagnosis to receipt of regular HIV primary care(71). Barriers to care can lead to lack of engagement which is of great concern as patients who are not engaged may not receive the benefits of ART treatment and can remain a more potent HIV transmission risk.

ART adherence and drug use status

Related to ART adherence is drug use status (actively using vs. non-actively using). Results from several studies have shown that drug use status is associated with adherence

to antiretroviral therapy. Actively using drugs has been consistently found to be associated with non-adherence and subsequently poorer clinical outcomes (38;46;72-77). Active drug use can also result in more severe non-adherence related consequences including nonstructured treatment interruption (NTI), which is a non-medically supervised, complete break from a prescribed treatment regimen. Persons actively injecting drugs, defined as daily injecting, were more likely to report a nonstructured treatment interruption(37). Treatment interruptions were also commonly reported by IDUs interfacing with the penal system, such as during intake and during release from custody (78). Similarly, Kerr et al. reported that the most frequently cited reason for ART discontinuation among IDUs was being incarcerated (79).

Type of drug used also impacts adherence levels. Of particular concern are persons abusing stimulants. In a longitudinal study of 150 HIV-infected individuals, Hinkin et al. found that not only was drug use associated with over a fourfold greater risk of adherence failure, but that stimulant users (cocaine, amphetamine or methamphetamine) were at the highest risk for failure(73). This is similar to a previous study conducted by Sharpe et al. showing that crack users were less likely than non-drug users to take their HIV medications as prescribed(80). Arnsten et al. conducted a longitudinal study investigating ART adherence among active and former cocaine users with electronic monitoring and found that active cocaine users adhered at levels less than one half than non users. Subsequently, the difference in adherence levels impacted viral suppression; at six months, only 13% of active users achieved viral suppression in comparison to 46% of non users (Arnsten). These findings are concerning particularly when considering that

crack cocaine use has been found to serve as a barrier to accessing ART(81), accelerate HIV disease progression (45) and increase mortality related to AIDS-related causes(44). However, a meta-analysis of studies assessing ART adherence among drug users found that overall adherence levels were similar to adherence levels reported by studies with HIV-seropositive non-drug users(38).

Project INSPIRE

Project INSPIRE, was a large scale randomized controlled trial of a peer-mentoring intervention to reduce HIV transmission, increase access to care and increase adherence to HIV medications among HIV-seropositive injection drug users(22). Nine hundred sixty-six (966) HIV-positive injection drug users were enrolled from four US cities and randomized to either receive a 10-session peer mentoring intervention (treatment condition) or an 8-session video discussion intervention (control condition). Study participants in both conditions reported reductions in sex risk and drug use risk behaviors, however, there were no significant differences by condition (98). Additionally, there were no significant differences in medical care and medication adherence by condition (98). A subsequent investigation of the same sample was performed by Knowlton et al, regarding effective ART therapy(82). Effective ART therapy, defined as achieving an undetectable plasma viral load (UVL) was found to be significantly related to having higher social support, stable housing and CD4 counts greater than 200.

ART adherence and substance abuse treatment

Participation in a substance abuse treatment program increases adherence to ART therapy. Siegal et al. reported that IDUs were more likely to adhere to ART if they were currently undergoing methadone treatment(83). In fact, Kapadia et al., found that individuals reporting receipt of *any* drug abuse treatment modality were more likely to report adherence to antiretroviral regimens(84). A recent effort by Berg et al. found that directly observed therapy (DOT) of ART with methadone maintenance therapy (MMT) was more successful than treatment as usual (TAU) in improving adherence with effects maintained for 24 weeks(85). However, it is important to note, on average, that only 15% of all substance users are undergoing substance use treatment at any one time(86;87).

Policymakers have long promoted the need to incorporate addiction treatment in conjunction with HIV primary care(88;89). However, treatment for addiction and HIV infection are often sourced independently and the optimal method of service integration and delivery have yet to be perfected(89;90). The Centers for Disease Control and Prevention's HIV Prevention Strategic Plan through 2010 advocated increasing the number of HIV positive substance users who abstain from drug abuse and for those who do not abstain, harm reduction strategies to reduce risk of HIV transmission. The treatment of choice for the patient who is both HIV-seropositive and is opioid dependent is long term treatment with an opioid agonist such as methadone. A recent study by Pettes et al. investigated methadone maintenance therapy among HIV-positive injectors and found that MMT was positively associated with adherence to ART (42). Similarly,

Uhlmann et al. reported that IDUs prescribed methadone exhibited a more rapid initiation and subsequent adherence to ART(43). Recent approaches have assessed the efficacy of integrating alternative therapies such as buprenorphine and naltrexone with HIV treatment (13;14;39;91;92). Each of these chemicals function as a mu-receptor opioid antagonist, they out compete and block the opioid receptor to stop feelings of euphoria, and have been used successfully to treat opioid dependence in conjunction with HIV treatment in limited venues (40;93). Additionally, Roux et al. reported that retention in opioid substitution treatment (OST) was a major predictor of long term virological success (94). However, concurrent receipt of ART and substance abuse treatment should not be considered preventive of continued risk behaviors. Chaudhry et al. reported that among a sample of 303 HIV-positive persons receiving buprenorphine, nearly one-quarter (24%) reported vaginal or anal sex without a condom during the previous 90 day period(95). The HIV primary care visit can successfully be used as a venue for providers to discuss HIV risk behaviors. Wilkinson et al. found that nearly two-thirds of a sample of 741 HIV-positive IDUs reported having discussed HIV prevention at their most recent HIV primary care visit(96) It is crucial for providers responsible for the care of HIV positive injection drug users to not only be aware of interactions between HIV treatment drugs and illegal drugs but to also assess and address any ongoing HIV risk behaviors.

ART adherence and the patient-provider relationship

As part of the patient-centered care, it is important that patients are able to confide in their provider if they are currently using drugs and/or if they are receiving drug treatment because it may affect their medication regimen, medication adherence and treatment outcomes. Beach et al. (97) reported that the quality of the patient-provider relationship is significantly associated with the receipt of ART, adherence to ART and having undetectable serum HIV RNA. A study performed by Johnson et al.(98) utilized a mediational analysis to investigate the relationship between positive provider interactions, adherence self-efficacy and adherence to antiretroviral medications. Results of this study and others indicated that positive provider interactions may foster greater self efficacy which is associated with better adherence to medications (9;99;100). Continued research in this area should seek to encourage strategies to enhance patient communication with their provider and conversely providers need additional training to build efficacy in providing care to injection drug users.

Self-efficacy

In describing the patient-provider relationship and its impact on adherence to antiretroviral medication regimens, which is paramount in the management of HIV(19), it becomes important to focus on one of the key constructs underlying the ability of patients to reveal to their providers that they are currently injecting drugs, namely self-efficacy. Self-efficacy is defined as the belief that one is capable to perform a specific activity, including confidence in overcoming barriers to performing that activity (101). Furthermore, Bandura et al. proposed that self-efficacy is an intrinsic prerequisite for

behavioral change because it impacts how much energy is devoted to completing a specific task and determines the level of performance that will be obtained (102). The concept of self-efficacy is central to Bandura's social cognitive theory which emphasizes the impact of observational learning and social experience on personality development (101). Self-efficacy is part of a reciprocal process that determines behavior; self-efficacy emerges from the interaction of personal, behavioral , and environmental factors resulting in behavior (20). Practically, a person with high self-efficacy views obstacles as chances to develop mastery whereas a person exhibiting low self-efficacy views obstacles as experiences to be avoided. The concept of self-efficacy has been used to elicit insight regarding the performance of specific health behaviors and to develop interventions that can increase self-efficacy to influence the actual performance of specific health behaviors(20). Self- efficacy has been particularly adaptable in assessing one's ability to manage chronic disease (e.g. asthma, diabetes, hypertension, HIV/AIDS) and adhere to a prescribed treatment regimen (102-104;104;105). Self-efficacy is one of the tools that can promote self management, central to long term treatment of a chronic disease (103).

Treatment of HIV as a chronic disease makes it important to investigate the role of self-efficacy to improve ART adherence, particularly among difficult populations with multiple co-morbidities. In light of the various studies reviewed, decreased adherence to HIV antiretroviral therapy among injecting drug users remains a serious and complex issue that needs to be comprehensively addressed at the level of the patient, provider and health care system to achieve optimal health outcomes (69-71;106). Use of ART as

prescribed can lead to increased CD4 counts, decreased viral load, and improved quality of life.

Project INSPIRE represents a large, longitudinal cohort of HIV infected injection drug users assessed regarding their use of HIV primary care services, HIV risk behaviors and psychosocial scales. These data provide a unique opportunity to investigate "self-efficacy to disclose drug use to your HIV primary care physician" (DISDR). Looking at study participant responses regarding this specific type of self-efficacy may provide insight into how to best intervene with drug using patients to ensure that they reveal their drug use to their provider. All study participants completed a structured questionnaire and were asked a series of questions assessing DISDR. Participant responses were grouped into "high" and "low" DISDR categories. This dissertation proposes to compare the two groups and identify significant differences between the groups that may guide future interventions.

This dissertation study will provide understanding regarding the role of self-efficacy in disclosing drug use to their physician. It is hoped that these findings can be used as a means to enhance the patient-provider relationship and lead to a more optimal ART regimen.

Chapter 3. Methods

This study uses cross-sectional and longitudinal data collected as part of the multi-site CDC-funded study entitled "Intervention Research for HIV-positive Injection Drug Users" (INSPIRE). The INSPIRE study was a five-year collaborative project (October 1999 - May 2005) designed to develop intervention strategies to address the primary and secondary intervention needs of HIV-seropositive injection drug users (IDUs). It was a randomized clinical trial designed to test the efficacy of a brief intervention to reduce HIV risk behaviors and promote access and adherence to HIV treatment. Specifically, INSPIRE was designed to develop, implement and evaluate HIV prevention strategies with HIV-positive IDUs to: 1) prevent HIV transmission due to high risk sex and injection drug use behaviors, 2) increase access, utilization and maintenance of primary health care, and 3) increase access, utilization and adherence of HIV treatments.

The Project INSPIRE research study was a collaboration between the Division of HIV/AIDS Prevention, National Center for HIV, STD and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA (Dr. David Purcell- Principal Investigator); Department of Epidemiology and Public Health, University of Miami, FL (Dr. Lisa R. Metsch- Principal Investigator); New York Academy of Medicine University, New York City, NY (Dr. Mary H. Latka- Principal Investigator); Center for AIDS Prevention Studies, University of California at San Francisco, San Francisco, CA (Dr. Cynthia A. Gomez - Principal Investigator); Health Resources and Services Administration, Rockville, MD (Dr. Lois Eldred- Principal Investigator); and the Department of Health

Policy and Management, Johns Hopkins University, Baltimore, MD (Dr. Carl A. Latkin-Principal Investigator).

The methods chapter will be organized into the following sections: 1) methods for the recruitment of study participants, 2) description of the measures used as part of the current analysis, and 3) statistical methods used in the analyses of the stated hypotheses.

Project INSPIRE Study Recruitment

Recruitment and Screening:

Study participants were recruited using both active and passive outreach strategies (posters, flyers and recruiting cards) in a variety of community venues including AIDS service organizations, HIV medical clinics, methadone clinics, needle/syringe exchange programs, and other programs serving HIV-positive IDUs as well as from known hangout areas of drug users such as neighborhoods, local parks known to be drug using locales. Regarding passive outreach strategies, potential participants coming into contact with flyers or recruiting cards could either contact an INSPIRE team member at the recruitment site, call a toll-free number to find out more information or they could refer others for potential participation if the study did not apply to them. Persons interested in study participation were screened either at the recruitment venue or via telephone. During screening, potential study participants received a brief description of the study and related activities.

Eligibility Criteria:

Study eligibility criteria were as follows: 1) at least 18 years of age, 2) self-reported injection drug use in the past year, 3) self-reported sex (defined as any physical contact with the opposite sex leading to an orgasm) with at least one opposite sex partner in the past three months, 4) self-identify as HIV-positive, 5) willingness to confirm their HIV serostatus through an HIV test of oral fluids, 6) agree to a blood draw for CD4 and viral load testing, 7) not be currently enrolled in an intervention study conducted by one of the Principal Investigators or have been enrolled in the pilot study, 8) live within the study area and be willing to provide contact information, 9) be able to communicate in a group setting in English (although assessment could occur in Spanish), and 10) indicate availability to attend the first intervention session. Potential study participants were screened either by telephone or face-to-face by trained interviewers using a computerized data entry program. Participants deemed eligible following the screening process were invited to join the study and scheduled for the first study appointment.

Baseline Assessment:

At the first study appointment ("baseline"), biologic measures (CD4/Viral Load counts) and a questionnaire assessment were used to obtain measures of behavior. Following consent and enrollment procedures, participants provided an oral fluid sample for confirmatory HIV antibody testing (OraSure; OraSure Technologies, Bethlehem, PA); results were not available for 1 to 2 weeks. Participants presenting at baseline with documentation of their HIV status could proceed with baseline activities. Eligible participants without HIV documentation completed their baseline assessment after they

were confirmed to be HIV-positive by the OraSure test. Following the oral specimen collection, two tubes of blood were also collected which were sent to the CDC laboratories to measure HIV viral load and true CD4 count. Following a staff-led orientation and practice session, participants were administered an audio computer-assisted self-interview (A-CASI) for baseline self-reported measures. With A-CASI, study participants listened to assessment questionnaires using private headphones, to enhance confidentiality, attached to a computer that simultaneously displayed text of each question on the computer monitor to be read. Participants currently taking HIV medications were asked to bring their medication bottles to the baseline visit. At three of the four sites, participants who were taking HIV medications and were not currently using an adherence aid (e.g., pill box) were asked to use a medication event monitoring system (MEMS) cap on one of their HIV medications (randomly chosen) to provide an additional measure of adherence. MEMS cap uses a microchip integrated into the cap of a pill bottle to electronically record the time and date of each opening thereby providing a measure of medication adherence (Aardex Corporation, Union City, CA, USA). Participants had their MEMS caps adherence data downloaded at each subsequent visit. (One site, San Francisco, chose not to offer MEMS caps to its participants because of the large number of studies using MEMS caps in the area).

At the completion of the baseline assessment, participants were given a date to return for the first session for randomization into one of the two intervention conditions. Trained staff randomized participants in small cohorts (ranging in size from ten up to thirty participants per randomization cohort) by gender using an algorithm that assigned

participants to one of the two intervention arms. Each randomization block was stratified by gender (block size of six for men and four for women) to account for anticipated excess male enrollment and to minimize the possibility of an intervention group having only one woman or man. A total of 70 cohorts (n=966 study participants) completed the baseline assessment and were randomized; additionally, some participants (n=195) were included as part of the baseline sample but were not randomized to either condition.

Integrated Intervention Condition: Peer Mentoring Intervention (PMI)

The PMI was based on the concepts of empowerment and peer leadership or advocacy(107), with exercises and activities grounded in social learning theory (SLT)(108); social identity theory(109); and the information, motivation, and behavioral skills (IMB) model (110). The purpose of the PMI, as presented to participants, was to engage them in learning about and trying out a new social role. Based on the theory-based development of the PMI, it was hoped that learning to be peer mentors would help study participants themselves to better protect themselves and their communities from HIV and other infections. Study participants randomized to receive the PMI intervention took part in a total number of 10 intervention sessions. Seven were group sessions led by a male and female facilitator, two matched-gender individual sessions and one "peer voluntary activity (PVA)"(22).

Control Condition: Video Discussion Intervention (VDI)

Participants in the VDI took part in eight sessions over five weeks. The VDI condition controlled for attention and experimental demand, and it provided one session of basic HIV prevention information. Subsequent sessions were led by two facilitators with each session having the following format: 1) a brief check in with participants, 2) viewing of videotape(s) on topics that were relevant and interesting to the participants' lives (45– 80 minutes), and 3) discussion led by trained facilitators. Videotapes were selected following thorough screening and piloting and included topics such as prejudice and discrimination, getting a job, Red Cross safety tips, drug overdose prevention, substance use in families, parental disclosure of HIV status to children, and prison experiences. The facilitators were trained to direct session discussions away from primary outcomes of interest and related variables of interest that might potentially introduce a bias for subsequent assessments.

Follow-Up Assessments:

Three follow-up assessments were scheduled for three, six, and 12 months after completion of the last intervention session. In most cases, follow-up assessments were not allowed to occur within 90 days of each other in an attempt to avoid inaccurate reporting of behaviors for the specified period queried and to ensure that the reporting periods did not overlap. Behavioral assessments were administered using A-CASI at each follow-up. All participants returning with their MEMS cap had its recorded adherence data retrieved at each visit. Participants also provided blood samples at the six- and 12-

month follow-up visits to establish corresponding biological CD4 and viral load for each follow up assessment.

Participant Reimbursement:

Monetary incentives were provided for all study activities to reimburse participants for their time and participation in the research study. Participants in both conditions (treatment and control) received $30 at the baseline assessment and $35, $45, and $50 for the three-, six-, and 12-month follow- up assessments, respectively. Those who were eligible and opted to use the MEMS cap were reimbursed an additional five dollars at baseline and at each follow-up visit to which they brought their cap. Participants were reimbursed $20 for each intervention session they attended. In addition, barrier incentives (e.g., tee-shirt with the project logo, condom carrying case, and journal) were made available to all participants at each session.

Measures Used for Dissertation Research:

Measures were identified via a thorough review of the literature and selected for inclusion into the current analyses if research findings documented a significant association between the measure and the dependent variable. Measures are grouped by domain (socio-demographic, HIV-care related, drug use related, psychosocial and parent study outcome) and listed below. Each domain contains several measures that will be used as part of cross-sectional and longitudinal analyses designed to answer the study aims. All measures were assessed regarding distribution of responses; subsequent dichotomizations of measures were based on the distribution of the response data. Socio-

demographic characteristics included age, racial/ethnic category, biological sex, education, personal annual income, site, and current living situation in the past year. The HIV-care related characteristics domain included self- perceived health in the past six months, taking control of healthcare, empowerment assessment scale, currently taking HIV medications, and satisfaction with quality of care at last primary care visit. Based on the potential impact on adherence as identified by the literature (14;39;40;42;111), the drug use related domain included the following characteristics: any admission to a hospital for drug treatment or detox in the past 6 months, receiving any of the 3 substance treatment programs (hospital, outpatient and MMT) in the past 6 months, frequency of alcohol use in the past 3 months, used crack in the past 3 months. Use of crack was separated out from overall drug use and analyzed separately due to the research findings identifying the role of crack use as negatively impacting HIV medication adherence (81;87). The psychosocial domain included two scales posited to impact DISDR; assessed were social support and level of depression. Also included in the analysis were three selected measures assessing primary outcomes identified in the original study and targeted as part of the Project INSPIRE intervention trial. Two outcomes are related to HIV-transmission risk and assess any sharing of drug use paraphernalia and any unprotected sex. The third outcome is related to utilization of HIV primary care and assesses patient attendance during the previous six months. Utilization of HIV primary care was measured by having two or more visits to an HIV provider in the past six months. This variable was selected in accordance with 2011 DHHS guidelines which recommend that persons living with HIV should be seen at least every 3-6 months by an HIV care provider to have their CD4 and viral load monitored and to assess their clinical

indication for antiretroviral therapy (49). This variable was also operationalized as two or more visits because participants only answered the question regarding the dependent variable if they had seen an HIV provider in the past six months. The transmission risk outcomes were assessed by the following measures: any reported needle lending or sharing of cooker, cotton or rinse water with at least one HIV negative or unknown status (HIV-/?) injection partner, any reported unprotected vaginal or anal sex with an HIV-/? partner and number of HIV primary care visits during the previous 6 months. It is important to note that these transmission risk behavior questions were selected to identify the participant's highest risk of transmitting HIV by lending or giving their injection equipment to someone who they know is HIV-negative or that they did not know their HIV status. Similarly, the sexual risk behavior outcome seeks to examine participants that report unprotected sex with a partner who they know is HIV-negative or whose status is unknown. Below is a full description of the dependent variable and following is a full description of the independent variables.

Dependent Variable:

Self-efficacy for disclosing drug use to an HIV provider (DISDR): In the participant interviews (both baseline and follow-up assessments), self-efficacy for disclosing drug use to a provider was assessed as a continuous score ranging from 1 to 5 where a higher score is equivalent to higher self-efficacy for disclosure. The scale was developed by the CDC/multi-site team for INSPIRE and had good internal consistency (alpha=0.86). The scale was derived from the following six questions: 1) I can tell my healthcare provider that I use drugs if they ask me, 2) I can tell a healthcare provider who seems judgmental

that I use drugs, 3) I can tell a healthcare provider that I used to use drugs, 4) I can tell a healthcare provider who seems caring that I use drugs, 5) I can tell my healthcare provider that I use drugs even if they don't ask me, and 6) I can tell a healthcare provider that I use drugs even if they seem to be in a hurry. The response categories were: 1) Absolutely sure I cannot, 2) Pretty sure I cannot, 3) Not sure , 4) Pretty sure I can, and 5) Absolutely sure I can. The scale score was calculated as the mean response to the six questions. For the purposes of the current analyses, self-efficacy for disclosing drug use to a provider is operationalized as a dichotomous measure: it is coded: 0 = low (mean score less than 4) and 1 = high (mean score of 4 or greater). The self efficacy score was dichotomized because of its skewed distribution, with 62.8% reporting a score of 4 or greater. Table 7 shows the distribution for the revised dichotomized variable at baseline, 6-months, and 12-months post baseline assessment. Table 8 shows the mean and standard deviation for the continuous scale at all assessment points.

Independent Variables: grouped by domain

Sociodemographic characteristics:

Age: Age was assessed at baseline by the question "What is your date of birth?" The response was in month, day, and year format. Age was calculated by subtracting the date of birth from the date of the interview. For the purpose of this analysis age is coded as a binary variable: 0 = under 40 years of age; 1 = 40 years and older. The mean age of the sample was 42.6 years of age with a median of 42; at the cutoff of 40, 32.1% of the sample was less than 40 years old at baseline.

Racial/Ethnic category: Two questions determined the participant's ethnic and racial category: "Do you consider yourself to be Hispanic or Latino?" and "How would you best describe your racial background: Asian, Black or African American, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, White, Other?" For the purpose of this analysis, ethnic and racial category is coded as follows: 0 = Non-Hispanic white; 1 = Non-Hispanic black; 3 = Hispanic; 4 = Non-Hispanic other.

Biological sex: Biological sex is operationalized as a binary variable. Biological sex was assessed by the question "Were you born male or female?" It is coded: 0 = Biological female; 1 = Biological male. Study respondents included 26 (3.2%) transgendered participants who will be coded by biological sex for the current analyses.

Education: Education is operationalized as a binary variable. Education was assessed by the question "How much education do you have: 8^{th} grade or less, some high school, no diploma, high school diploma or GED, some college or technical training, college degree like BA or BS, any graduate training?" For the purpose of this analysis education is coded as follows: 0 = non-high school graduate or 1 = graduated high school or higher.

Income: Income is operationalized as a binary variable. Income was assessed by the question "Which best describes your total personal income in the last year from all sources less than $5,000, $5,000 to $10,000, $10,000 to $19,999, $20,000 to $29,000, Greater than $30,000?" Slightly greater than half of the respondents (51.8%) reported a

personal annual income of less than $5,000; for the purpose of this analysis "income" is coded: 0 = Less than $5,000; 1 = Greater than $5,000.

Site: Site is operationalized as a categorical variable. Name of site was recorded by the interviewer. For the purpose of this analysis it is coded: 0 = Baltimore; 1 = Miami; 2 = New York; 3 = San Francisco.

Marginally housed: Marginally housed is operationalized as a binary variable. Marginally housed was assessed by the question "In the past year have you slept at least one week in any of the following places: squatting place, abandoned building, car, homeless shelter, park or street?" For the purpose of this analysis it is coded: 0 = No; 1 = Yes.

HIV-care related characteristics:

I don't have any health insurance: "I don't have any health insurance" is operationalized as a binary variable and was assessed by the question "What kind of health insurance do you currently have?" For the purpose of this analysis it is coded: 0 = No insurance; 1 = Yes, any type of insurance.

Health in the past 6 months: "Health in the past 6 months" is operationalized as a categorical variable. "Health in the past 6 months" was assessed by the question "In general, would you say your health in the past 6 months was excellent, very good, good, fair or poor?" Initial review of the distribution of the variable showed an even three way

grouping with 38% of the sample reporting health as “fair or poor”, approximately 37% thought their health was “good” and the remainder felt it was either “very good” or “excellent”; for the purpose of this analysis “health in the past 6 months” is coded: 0 = Excellent or very good; 1 = Good; 2 = Fair or poor.

Patient provider relationship: “Patient provider relationship” is operationalized as a continuous score ranging from 1 to 5 where a higher score is equivalent to higher patient provider relationship. The scale used is the “Engagement with Healthcare Provider Scale”, a 12-item scale (alpha = 0.95) developed by Bakken et al.(112). Examples of the items include the following: “My healthcare provider or doctor listens to me” and “My healthcare provider or doctor cares about me”.

Taking control of healthcare: “Taking control of healthcare” is operationalized as a continuous score ranging from 1 to 5 where a higher score is equivalent to higher level of taking control of healthcare. This is a 4 item scale developed by the multi-site team for INSPIRE (alpha = 0.62). Items in the scale are: I make and keep my appointments with my healthcare provider every 3 to 4 months, I don't ask my healthcare provider about my treatment options, I keep a list of symptoms to tell my healthcare provider, I don't write down questions before seeing my healthcare provider, I ask my healthcare provider to explain a word that I don't know, I'm sometimes too high or dope sick when I go to the healthcare provider, I tell my healthcare provider my symptoms.

Empowerment assessment scale: "Empowerment assessment scale" is operationalized as a continuous variable ranging from 1 to 4 where a higher score is indicative of higher perceived ability to influence one's environment. The 28-item empowerment assessment scale was developed by Rogers et al. (113) with an alpha = 0.76. Examples of the items include the following: "I can pretty much determine what will happen in my life" and, "People are only limited by what they think is possible"

Currently taking HIV meds: "Currently taking HIV meds" is operationalized as a binary variable. "Currently taking HIV meds" was assessed by the question "Are you taking medications for your HIV at this time?" For the purpose of this analysis it is coded: 0 = No; 1 = Yes.

Satisfied with quality of care: "Satisfied with quality of care" is operationalized as a binary variable. "Satisfied with quality of care" was assessed by the question "How satisfied were you with the quality of care you received at this most recent visit?" For the purpose of this analysis it is coded: 0 = Very satisfied; 1 = Less than very satisfied.

Drug use related characteristics:

Any admission to a hospital for drug treatment: "Any admission to a hospital for drug treatment" is operationalized as a binary variable. "Any admission to a hospital for drug treatment" was assessed by the question "In the past 6 months, how many times have you been admitted to a hospital for drug treatment or detox?" For the purpose of this analysis it is coded: 0 = No; 1 = Yes.

Receiving any of the 3 substance treatment programs (hospital, outpatient, MMT): "Receiving any of the 3 substance treatment programs (hospital, outpatient, MMT)" is operationalized as a categorical variable. "Receiving any of the 3 substance treatment programs (hospital, outpatient, MMT)" was assessed by the following questions "In the past 6 months, how many times have you been admitted to a hospital for drug treatment or detox? In the past 6 months, have you been in an outpatient drug treatment program? and Are you currently in a Methadone maintenance program? For the purpose of this analysis it is coded: 0 = No (no receipt of all 3 substance treatment programs); 1 = Yes (receipt of any of the 3 substance treatment programs).

Alcohol use in the past 3 months: "Alcohol use in the past three months" is operationalized as a categorical variable. "Alcohol use in the past three months" was assessed by the question "Please select the number that most represents how often you have drunk alcohol in the past 3 months? "Drinks" were defined as a 12 ounce can of beer, a glass of wine, a wine cooler, a cocktail, or a shot of liquor." For the purpose of this analysis it is coded: 0 = every day or two to six times per week; 1 = Once a week to less than once per month; 2 = No alcohol use.

Non-injected drug use: "Non-injected drug use in the past three months" is operationalized as a categorical variable. "Non-injected drug use in the past three months" was assessed through self-report of non- injection drug use behaviors. For the

purpose of this analysis it is coded: 0 = did not use non-injected drugs; 1 = Used non-injected drugs but did not include crack; 2 = Used non-injected drugs including crack.

Psychosocial characteristics: Social support scale: "Social support scale" is operationalized as a continuous score ranging from 1 to 5 where a higher score is equivalent to higher social support. The scale was adapted from Barrera, M.A., "A method for assessing social support networks in community survey research" and had an alpha = 0.87 (114). "Social support" was assessed using responses to a 5-item scale. Examples of the scale items include: "If you wanted to talk to someone about things that are very personal and private or if a situation came up where you needed some advice, is there any one you could talk to?" and "Is there anyone who would give up some of their time and energy to help you do things, like going with you some place you needed to go, helping you do some work around the house, going to the store for you, and things like that?" . For the purpose of the analysis is coded as a range from 1(low social support) to 5 (high social support).

Brief symptom inventory: depression subscale: "Brief symptom inventory: depression subscale in the past week" is operationalized as a continuous score ranging from 1 to 5 where a higher score is equivalent to higher level of depression symptomatology. The scale was developed by Derogatis et al. and has an alpha = 0.88 (115). "Brief symptom inventory: depression subscale in the past week" was assessed using responses to a 5-item scale. Examples of items asked were "In the past week, how much have you been bothered by thoughts of ending your life?" and "In the past week, how much have you

been bothered by feeling lonely?". For the purpose of the analysis is coded as a range from 1(low depression) to 5 (high depression).

Parent study primary outcome variables:

Any sharing of cooker, cotton, or rinse during injection drug use: "Any sharing of cooker, cotton, or rinse during injection drug use in the past three months" is operationalized as a binary variable and created as a composite variable comprised of several questions assessing injection drug risk related risk behaviors. As part of the assessment, study participants were asked regarding the number of injection risk behaviors (syringe sharing and sharing of injection paraphernalia such as cookers, cottons and wash water) during the previous three months. "Any sharing of cooker, cotton, or rinse during injection drug use in the past three months" was assessed through self-report of injection drug use risk behaviors. Any participant response of yes to any of the following risk behaviors: syringe sharing, sharing of cookers, sharing of cottons or sharing of wash water were coded as "yes" with regards to the outcome variable. For the purpose of this analysis it is coded: 0 = No; 1 = Yes

"Any unprotected vaginal or anal sex with HIV- or unknown status partner in the past three months": is operationalized as a binary variable and created as a composite variable comprised of several questions assessing sexual risk behaviors. "Any unprotected vaginal or anal sex with HIV- or unknown status partner in the past three months" was assessed through self-report of sexual risk behaviors with all partner types for which HIV status was negative or unknown. As part of each assessment, study

participants were queried regarding their sexual behaviors (protected and unprotected) with their previous three partners during the previous three months (four if the main partner was not among the previous three sexual partners). Sexual partners were grouped into the following HIV status categories: HIV-positive, HIV- negative, and HIV unknown. Any participant response of yes to unprotected sex with an HIV-negative or unknown status partner was coded as "yes" with regards to the outcome variable. For the purpose of this analysis it is coded: 0 = No; 1 = Yes.

Number of primary healthcare visits for HIV in the past 6 months: "Total number of primary healthcare visits for HIV in the past 6 months" is operationalized as a binary variable. "Total number of primary healthcare visits for HIV in the past 6 months" was assessed by the question "How many of these primary healthcare visits have you had in the past six months? This question was only asked if the date recorded for their previous primary healthcare visit was within six months of the baseline assessment date. For the purpose of this analysis it is coded: 0 = 0 (less than two visits) and 1 = (two or more visits).

Sample for the current analyses: A total of 1161 HIV-positive injection drug users were enrolled in the study and completed the baseline assessment and 966 participants were randomized to either receive the intervention or the control condition and thus had the opportunity to participate in follow up assessments (and be eligible for this dissertation research secondary analysis). For the purposes investigating the study aims, we included two additional inclusion criteria. The sample for the current study will be

restricted to the 814 study participants who were enrolled at baseline, completed the scale assessing "self-efficacy to disclose drug use to their provider" and received either the intervention or control condition. Participants that did not have any primary healthcare visits for HIV or AIDS were not asked questions regarding DISDR and were subsequently excluded from this dissertation study.

Statistical Analysis Plan

The dependent variable in the current analyses is "self-efficacy to disclose drug use to one's provider". The first specific aim is to identify variables that were significantly associated with self-report of having higher self-efficacy to discuss drug use with their provider. Descriptive analyses were performed for all independent and dependent variables (means for continuous variables and frequency distributions for categorical variables) at the baseline, 6- month and 12- month assessment points. To determine the association between the dependent variable and selected independent variables, univariate logistic regressions were conducted for each independent variable on the dependent variable at the baseline, 6- month and 12- month assessment points. Dummy variables were created for each of the variables with more than two levels as indicated in the description of the measures. Multivariate logistic regression modeling was performed in accordance with the recommendations of Hosmer and Lemeshow(116). Univariate analyses of independent variables from each of the following domains (sociodemographic characteristics, HIV-care related characteristics, drug use related characteristics, psychosocial characteristics) were entered into logistic regressions with the outcome variable. Variables that were significantly associated with the outcome variable at the

alpha $\leq$ 0.25 level were subsequently included in the initial logistic regression model. Collinearity was tested for as part of the variable selection process. Parsimonious models were developed by including selected socio-demographic variables (race/ethnicity, age, education, annual income, and biological gender) and excluding variables exceeding alpha >0.05 in a stepwise manner through backward elimination. Subsequent logistic regression modeling determined the optimal regression model best describing the associations between the independent variables with the dependent variable.

Regarding specific aim number two, the main research question was to elucidate if the relationship between self-efficacy to disclose drug use to one's provider and sociodemographic characteristics, HIV-care related characteristics, drug use related characteristics, psychosocial characteristics, and receipt of the intervention persists over time. To analyze this relationship, Generalized Estimating Equations were used (PROC GEE in SAS) which allows analyses of repeated measurements are taken on subjects with regards to a specific variable or set of variables, in this case the dependent and independent variables. The generalized estimating equation approach (GEE) is an extension of the generalized linear model (GLM) method used for correlated data to obtain valid standard errors of the estimate in the absence of assumptions regarding distributions of response (117). The lack of assumptions regarding distributions of the response variable excluded the ability to apply modeling based on the maximum likelihood theory for generalized linear models (GLM), and model fit was assessed using a model-selection method applicable for GEE based on quasilikelihood under the independent model criterion (Qic) as proposed by Pan (118). The initial GEE model

included variables that were significantly associated to the outcome variable at the alpha ≤ 0.25 level in univariate analyses. Subsequent model fit was determined by the lowest Qic in accordance with the aforementioned methodology. This analysis allows the modeling of the relationship between the dependent variable and independent variables over time and provides insight into any changes in the strength, direction and persistence of association.

The third specific aim focused on the relationship between DISDR and the a priori INSPIRE primary outcomes of reduced sexual risk, injection-related risk behaviors and use of HIV care. To determine the association between each dependent variable and selected independent variables, univariate regressions of each independent variable on each of the dependent variables at the baseline assessment were performed. DISDR was then entered into a GEE regression model along with socio-demographic characteristics and, intervention assignment, for each of the primary outcomes. All statistical procedures were conducted using SAS Version 9.2 for Windows.

Chapter 4. Results

Means & Frequencies

The results chapter will be organized by study aim. Results from the first and second study aims will encompass baseline (descriptive, univariate logistic regression and multiple logistic regression) analyses and follow up (GEE) analyses respectively. Results from the third study aim will report findings from univariate logistic and GEE modeling analyses of DISDR and selected main study outcome variables.

The analytical sample (N=814) was approximately two-thirds male, 67% non-Hispanic Black, 15.5% Hispanic and 9.2% White Non-Hispanic (Table 1). Sixty-eight percent of the sample were 40 years of age or older. More than forty percent (41.9%) did not complete high school or a general educational development (GED) program, and more than half (51.8%) of the respondents had an annual income of less than $5,000 (Table 1). Nearly one third (31.1%) of participants reported being marginally housed in the past year and the majority (71.4%) reported having ever been incarcerated. Study participants were recruited from the following sites: 28.1% recruited from Baltimore, 24.7% recruited from Miami, 23.1% recruited from New York and 24.1% recruited from San Francisco. At six month and twelve-month assessment points, there were no notable differences with respect to variables in the socio-demographic domain between baseline and subsequent follow up assessments. This is most likely due to the follow up rate for this sample being nearly 80% at the six- month follow up and 73.5% at the 12- month follow up and there was no systematic bias in loss to follow up.

HIV-care related characteristics

Of the recruited sample, the mean number of years of living with HIV was 9.3 (6.5 S.D.) (Table 2). Nearly 40% felt that their "health in the past six months" had been "fair" or "poor". A majority of respondents were currently receiving HIV antiretroviral therapy (63.8%) with 89.7% reporting having attended an HIV primary care visit within the previous six months. The majority of study participants reported having Medicaid (53.2%) or Medicare (28.7%) with a smaller number covered by private health insurance (6.1%) or the Veterans Administration (4.5%). Nearly one-fifth (19.3%) of the sample reported having no health insurance at baseline. At six month and twelve month assessment points the percentage of participants reporting "no current health insurance" decreased from 19.3% at baseline to 13.6% (6-month) and 11.9% (12-month). As seen in Table 2 participants were also assessed with regards to "taking control of one's health care", participants reported an average of 3.0 (ranging from lowest=1 and highest=5) and with regards to "patient –provider communication" (mean=3.5) (scale ranging from lowest =1 to highest =5). There were no notable differences with respect to HIV-related characteristics between baseline and follow up assessments.

Drug-use characteristics

In order to meet enrollment criteria, all study participants had to report at least one instance of injection drug use during the previous twelve months. At baseline all participants self-reported injecting drugs at least once during the past twelve months. Injection drug use could have included, but was not limited to, heroin, cocaine, methadone, crack cocaine, methamphetamine, or a mixture of the above. At baseline,

regarding alcohol use, almost 40% used alcohol either on a daily basis or at least “2 to 6 times each week”. During the six months prior to the study, more than one-third (33.9%) of all participants reported being admitted to a hospital to receive drug treatment with a total of 63.6% receiving substance abuse treatment from either a hospital, outpatient treatment or methadone maintenance treatment (MMT) program during the previous six months. Participants reporting no alcohol use during the previous three months increased from 26.8% at baseline to 43.6% and 48.4% at subsequent follow ups. Participants reporting "having no current health insurance” decreased from 19.3% at baseline to 13.6% (6-month) and 11.9% (12-month). Overall drug use related risk behaviors, defined as “any needle sharing of cookers, cottons or rinse water” saw a decrease from 27.7% at baseline to 8.3% at 6- month and 5.4% at 12- month follow up assessments.

Psychosocial assessments

With regards to additional psychosocial assessments, respondents reported an average of 4.1 (ranging from lowest =1 to highest =5) on the social support scale (Table 2). Additionally, respondents reported an average of 2.0 on a standardized scale to assess depression (ranging from 1 = no symptoms to 5 = strong symptoms). With respect to psychosocial assessments there were no differences at six month and twelve month assessment points.

Parent study outcome variables

Regarding the selected parent study outcome variables, 27% of study participants reported lending of needles or shared drug paraphernalia with HIV-negative/unknown

serostatus in the past three months as "yes" (Table 1). Slightly more than one quarter (25.09%) reported any unprotected vaginal or anal intercourse with HIV-negative/unknown serostatus partners in the past three months as "yes". A majority of participants (78%) reported attending two or more HIV primary care visits during the past six months.

Baseline: Univariate logistic regression

The following paragraphs will be a description of independent variables individually regressed on self-efficacy to disclose drug use to an HIV healthcare provider (DISDR). Independent variables will be grouped by domains as previously presented.

Sociodemographics

With regards to sociodemographic variables we analyzed the following factors for significance at the univariate level: biological sex, level of education, level of income, recruitment site, employment status, marginally housed in the past year, and having ever been incarcerated. Table 3 presents that of these factors, those significantly (at the alpha 0.25 or lower) related to disclosure of drug use to one's HIV primary care provider at baseline were as follows: marginally housed in the past year and recruitment site. Reporting being "marginally housed in the past year for at least one week", (e.g. shelter, sleeping in car, sleeping in a park), was associated with a low DISDR (OR=0.713, CI: 0.527-0.964, p= 0.029). When compared to participants recruited from Baltimore (reference site) participants recruited from the Miami site were less likely to report high

self-efficacy to disclose drug use to their provider (OR=0.379, CI: 0.255-0.563 , p = <0.001).

HIV care related characteristics

With regards to HIV-related characteristics, we analyzed the following factors for significance at the univariate level: time since HIV diagnosis, currently taking HIV meds, perceived health during the past six months, patient-provider relationship scale, scale assessing "empowerment" and scale assessing "control of one's healthcare". Of the recruited sample, the following HIV-related characteristics were significantly (at the alpha 0.25 or lower) related to the outcome variable at the univariate level: currently receiving HIV medications was negatively related to self-efficacy to disclose drug use to one's provider (OR=0.666, CI=0.494-0.898, p=0.007). Participants reporting their perceived health during the previous six months as being "poor" were less likely to report a high self- self efficacy to disclose drug use to their provider(OR=0.547, CI=0.373-0.803, p=0.001). Additionally when compared to persons reporting "excellent or very good" health during the previous six months, persons reporting perceived health as "good" were also less likely to report a high DISDR (OR=0.492, CI=0.335-0.724, p = 0.001).

Drug-use characteristics

Regarding drug-use related characteristics, the following independent variables were analyzed for significance at the univariate level: alcohol use during the previous three

months, crack use, admission to a hospital for drug detox or treatment during the previous six months, attending any substance treatment program (hospital, outpatient, or methadone maintenance during the past six months, and talking with their provider about safer drug use. The following drug-use related characteristics were significant and positively associated with self-efficacy to disclose drug use to one's provider at the univariate level (alpha 0.25 or lower): admission to a hospital for drug detox or treatment (OR=1.380, CI=1.019-1.870, p=0.036), attending any substance treatment program (hospital, outpatient, or methadone maintenance during the past six months (OR=1.531, CI=1.144-2.049, p=0.004), and no alcohol use during the previous three months (OR=1.442, CI=1.008-2.062, p=0.115). Having used crack cocaine in the past three months was negatively associated with high DISDR (OR=0.658, CI=0.464-0.934, p=0.027) as was use of drugs other than crack cocaine (OR=0.617, CI=0.415-0.917, p=0.027).

Psychosocial characteristics

With regards to potentially associated psychosocial characteristics we analyzed the following independent scales for significance at the univariate level: social support scale and BSI depression scale. Social support and BSI depression scales were both significantly related to the outcome of interest at the univariate level (alpha 0.25 or lower). Whereas social support was positively related to high DISDR (OR=1.801, CI=1.545-2.141, p= <001), higher scores on the BSI depression scale was significantly and negatively associated with self efficacy at the univariate level (OR=0.841, CI=0.718-0.985, p = 0.032).

Baseline: Multiple Logistic Regression

All variables found to be significant at the p=0.25 or less at the univariate level were entered into a subsequent multivariate logistic regression model and analyzed for best explanation of the outcome variable. The full logistic regression model, presented in Table 4, shows all of the variables included in the initial model. The following sociodemographic variables were forced in: race, age, education level, income level, and site of recruitment.

After completing a backward stepwise elimination the reduced model is presented in Table 5. Sociodemographic variables (such as race and gender) were forced into the final model to control for potential confounders. In the reduced model we controlled for Age, Race, Sex, Income, and Education. When compared to participants recruited from Baltimore, participants recruited from Miami were 55% (AOR=0.452, CI=0.291-0.702, p=0.000) less likely to exhibit high self-efficacy to disclose drug use to their HIV provider. Participants currently taking HIV medications were 42% less likely to exhibit high self-efficacy. However, persons reporting a strong patient provider relationship were nearly two times (AOR=1.981, CI=1.502-2.613, p=<0.0001) as likely to have high self-efficacy. Additionally, participants with a high level of "social support" and reporting "taking control of one's healthcare" were 60% (AOR=1.600, CI=1.323-1.935, p=<0.0001) and 80% (AOR=1.789, CI=1.323-2.419, p=0.000) more likely to report high self-efficacy.

Longitudinal Analysis: General Estimating Equations

GEE Reduced Model

All variables, significant at the univariate level at alpha = 0.25 level, were entered into a General Estimating Equations model and analyzed for best explanation of the outcome variable. Table 6 represents the initial full model prior to commencing model reduction. Subsequent modeling resulted in a GEE reduced model. The reduced model used 1960 of 2056 possible values resulting in a QIC statistic of 2345.62 indicating a more accurately descriptive model than the full model.

After completing a backward stepwise elimination the reduced GEE model is presented in Table 7. In the reduced model of the longitudinal analysis, in addition to the treatment variable "condition" and the "time" or assessment related variable "assess," we included all of the variables by domain that were significant at the univariate level. In the reduced model we controlled for age, race, sex, income, and education even though they were not significantly associated with the outcome of interest. When compared to participants recruited from San Francisco, participants recruited from Miami were nearly 34% OR=0.666, CI=0.468-0.947, p=0.024) less likely to self-report high self-efficacy to disclose drug use to their HIV provider. Participants reporting no attendance in a drug treatment program during the previous six months were 24% less likely to exhibit high DISDR. Currently taking HIV medications was negatively associated with a high DISDR OR= 0.751, CI=0.601-0.938, p=0.012) in the final model. However, persons

reporting a strong patient provider relationship were 65% (OR= 1.655, CI=1.377-1.989, p=<0.0001 as likely to have high self-efficacy. Additionally, participants with a high level of "social support" and reporting "taking control of one's healthcare" were nearly 58 % OR=1.579, CI=1.386-1.798, p=<0.0001 and 93% OR=1.926, CI=1.605-2.310, p=0.000) more likely to report high self-efficacy.

Parent study main outcomes: General Estimating Equations

We performed univariate regressions of each of the dependent variables (sex risk, injection risk, HIV primary care) on DISDR at the baseline, 6- month and 12- month assessment points (Table 1). With the exception of sex risk, we found that DISDR was not significantly associated with the other parent study outcome variables at the bivariate level alpha <0.25. When regressed on DISDR at baseline, persons having self-reported "yes" to having had any unprotected vaginal or anal sex with an HIV -/? partners were 36.6% more likely to have reported high DISDR (OR=1.366, CI=0.986-1.890, p=0.060). When injection risk and HIV primary care were regressed on DISDR, self-reported injection drug use risk (OR=0.866, CI=0.621-1.208, p=0.398) and HIV primary care (OR=0.834, CI=0.593-1.796, p=0.297) were negatively but not significantly associated with either dependent variable. To further explore the possibility of any significant relationship existing between each of the dependant variables and DISDR after receipt of the intervention, we performed a GEE regression correcting for receipt of the intervention, the socio-demographic characteristics of race, age, education, biological sex, site and DISDR (Tables 8-10) for each of the dependent variables. Subsequent regression results documented in Tables 8-10 demonstrate that there is no significant

relationship between DISDR and the parent study outcome of attending an HIV primary care visit during the previous 6 months. However, when entered into a GEE modeling the dependent variables of sexual risk behavior and injection risk behavior, having a high DISDR was slightly negatively associated with sexual risk behavior (AOR= 0.946, CI= 0.915-0.978, p=0.001) and injection risk behavior (AOR= 0.963, CI= 0.931-0.997, p=0.0334) but receipt of the intervention was not significant in either model. Although not significant at the alpha=0.05 level, persons with high DISDR were nearly 14% less likely to report injection drug risk (AOR= 0.866, CI= 0.621-1.208, p=0.398). Additionally, in a corrected model including socio-demographics and city of recruitment, DISDR was not significantly predictive of receipt of two or more HIV primary care visits during the previous twelve months (AOR= 0.986, CI= 0.688-1.413, p=0.938).

Summary of Specific Aims & Hypotheses Results

Hypotheses tested in this study were presented in Chapter 1; following is a summary of results as they relate to these hypotheses. Regarding specific aim 1 and baseline hypotheses, hypothesis 1.1 was not confirmed; instead of finding a positive association between current receipt of HIV medications and a higher DISDR, a significant negative association was found. Report of a more positive patient provider relationship was positively associated with having a higher DISDR confirming hypothesis 1.2. Similarly, hypotheses 1.3, 1.4, 1.5 were confirmed; attending a drug treatment program during the previous six months, "taking control of one's health care", and reporting a higher social support were all positively associated with having a higher DISDR respectively. Regarding specific aim 2 and longitudinal hypotheses, hypothesis 2.1 was not confirmed;

rather than finding a positive association between currently receiving HIV medications and a higher DISDR longitudinally, a significant negative association was found. However, hypotheses 2.2-2.5 were all confirmed; reporting a more positive patient provider relationship, attendance of a drug treatment program during the prior six months, "taking control of one's health care", and reporting a higher social support were all positively associated with having a higher DISDR respectively over time. With regards to specific aim 3 and the relationship between DISDR and selected Project INSPIRE outcome variables, hypotheses 3.1-3.3 were not confirmed. There was no significant relationship between DISDR and sexual risk and injection risk-related behaviors. Similarly, DISDR was not related to use of HIV primary care during the previous six months.

Chapter 5. Discussion

This study presents baseline and longitudinal data that suggest a positive association between self-efficacy to disclose injection drug use to one's HIV primary care provider (DISDR) and the following variables: patient-provider relationship, attendance of a drug treatment program during the previous six months, "taking control of one's healthcare," and social support. However, current receipt of HIV medications and being recruited from the city of Miami were negatively associated with reporting a high DISDR.

HIV infection is a manageable chronic disease with a myriad of options available to tailor an optimal treatment regimen to all HIV-infected populations including substance users. Central to developing and adhering to an optimal ART treatment regimen is the patient-provider relationship. The patient-provider relationship remains a powerful route through which patients and providers can work together on forging successful long term treatment strategies and empower patients to engage in disease self-management. Findings have shown that when patients report the simple acknowledgment that their provider "knows them as a person," they are more likely to report a higher quality of life, being followed in clinic longer and having fewer missed appointments (95). It is the role of the physician to engage and retain medically underserved and stigmatized populations such as substance users. Physicians treating HIV infection are likely to encounter persons with co-morbid infections such as substance abuse disorder therefore should be trained to provide care that addresses the special needs of these patients. Physicians treating IDUs can successfully incorporate assessing patients for current drug use or current receipt of substance abuse treatment as part of a normal clinical encounter as needed. Patients

actively abusing drugs and/or actively receiving substance abuse opioid agonists such as buprenorphine or naltrexone concurrently with HIV treatment regimens can have adverse reactions. Admittedly, not all physicians are likely to encounter HIV infected injection drug users and given the average number of patients seen daily, it may be less possible to spend a fair amount of time with each patient to conduct a thorough risk assessment; these recommendations might be perceived as difficult to implement. Potential intervention strategies might also consider incorporating trainings designed to increase the ability of the clinic staff, in addition to the HIV primary care physician, to detect substance abuse and subsequently refer to appropriate treatment.

In the current study, receipt of substance abuse treatment, irrespective of modality, within the previous six months, was significantly associated with high self-efficacy to disclose injection drug use to one's HIV primary care provider. Numerous studies have demonstrated that subsequent adherence to ART increases when substance-using HIV-seropositive patients are treated for HIV in conjunction with attending substance abuse treatment programs (14;91;93;94). It is possible that substance abuse treatment provided messages that continue to impact participants' ability to disclose drug use to their physician beyond their involvement in substance abuse treatment. As part of HIV treatment, guidelines indicate that physicians should assess patients for active drug use, or current receipt of substance use treatment to avoid potentially adverse drug interactions. A recommendation for clinicians treating this population is to have a referral network in place when persons in need of substance abuse treatment are identified. If persons are actively receiving substance abuse treatment, the treatment

program should be contacted to assess current mode of treatment and to provide the program the treating physician's information. An additional recommendation would be to increase the availability of substance abuse treatment programs locally. The advent of increased availability would be key in increasing access and utilization of the programs; however it remains important that these programs be seamlessly linked to HIV primary care as part of a complete HIV treatment plan. The need for greater integration of HIV primary care and substance abuse treatment is evident, particularly in high risk, co-morbid populations.

Also, associated with self-efficacy to disclose drug use were patients self-reporting "taking control of one's healthcare." Interestingly, the strength of the association increased, when all follow up data were considered, to surpass the effect of the patient-provider relationship. This might indicate that ongoing participation in HIV treatment is acting as "first hand mastery experience" which has been shown to "change behavior through the common pathway of perceived self-efficacy" (119). Mastery may provide a greater sense of feeling in being in "control of one's healthcare" rather than being controlled by one's health ills. A patient empowered through the accumulation of "first hand mastery experiences" might be a more adherent patient with greater confidence in sharing all aspects of their health during patient-physician dialogues. Potential interventions might include reinforcement strategies that trained physicians or other clinic staff could deliver at each medical visit, e.g., "your health is improving because you keep your medical appointments." Additionally, clinic staff could also be trained to deliver brief reinforcement messages when calling patients to set appointments or at the end of

keeping an appointment which could serve as positive behavior boosters to improve continued engagement in HIV treatment. Success in the management of chronic diseases such as HIV often require many elements of individualized healthcare, such as consistent and numerous regular medical visits or changes to medication treatment regimens requiring additional adherence enforcing strategies that fall outside of the realm of the physician visit. However, these strategies are key in establishing "self-management," which is particularly important in the management of HIV disease as in other chronic diseases. Successful treatment of chronic disease involves the implementation of the following core elements of self-management: problem solving, decision-making, developing partnerships with your health providers and taking action (120). Given the assessment and treatment of HIV infection as a chronic disease, interventions should target elements that can directly impact the incorporation of disease self management.

Social-support was significantly associated with self-efficacy to disclose injection drug use to one's provider. Historically, social support has been linked to the successful treatment of chronic diseases such as diabetes, hypertension and asthma (101). Koenig et al, successfully implemented an intervention to prevent ART adherence failure by improving social support (121). Rosland et al. (2010) conducted a recent review of programs designed to use family support as part of chronic disease management and found that programs that train family in supportive communication techniques successfully improved patient symptom management and health behaviors(122) . Social support may function as a secondary source of support for persons when their own ability to manage their disease may falter, as may be the case in a long course treatment of

disease. Additionally, social support may function to buttress self-efficacy. It is feasible that efforts can be made to increase social support in the context of the patient's ongoing treatment regimen. A study conducted by Rosland et al., regarding family and friend participation in primary care visits of patients with diabetes or heart failure showed that patients were 77% more likely to understand physician advice and recommendations and 44% more likely to discuss difficult topics with physicians when companions were present during medical visits (123). Additionally, social support has been shown to be effective in moderating nonadherence effects of current alcohol and other drug use among patients currently receiving ART (124). Social support could be used as a tool to establish and strengthen communication between the patient and provider. This communication is particularly relevant in patients receiving ART therapy given potential changes in treatment strategies requiring extensive discussion and comprehension of the changes by the patient. An additional possibility might be to enlist the help of a friend or family member. HIV primary care physicians could be trained to incorporate inquiry about who could serve as a source of strength or "social support" that the patient can turn to for help at the initial medical visit. Once identified, that person or persons can be called upon to attend HIV primary care visits with the patient. Further investigations are needed to elucidate how social support impacts self-efficacy to disclose drug use to one's provider so that effective interventions can be developed.

It is interesting to note that currently receiving HIV medications was significantly associated with lower self-efficacy to disclose drug use to one's provider. While treatment guidelines clearly promote the initiation of an ART therapy regimen among

active drug users, it is well documented in the literature that HIV care providers share a consistent concern regarding prescribing an ART regimen to an actively injecting drug user due to perceived instability and potential nonadherence (54;59). It is plausible that the perceived stigma of injection drug use lead patients to feel the need to conceal their active use to avoid their access to ART from being withheld. Due to the often clandestine nature of the drug use subculture, it is feasible that some patients harbor mistrust towards their HIV primary care provider. However, since directionality was not tested, a causal relationship cannot be confirmed. Decreased levels of trust are directly related to fewer HIV-related care visits (125). The findings of this dissertation study underscore the continued need for sensitivity by physicians when interacting with HIV seropositive patients who use drugs. There is a need to understand patient attitudes and beliefs associated with nondisclosure that can be used to develop targeted curriculum for medical students, interns and practicing doctors that may encounter this complex population.

Lastly, it is important to note that city of recruitment was associated with self-efficacy to disclose drug use to one's provider. Participants recruited from Miami reported lower DISDR than those enrolled in other cities. New York, San Francisco, Baltimore have active syringe exchange programs and Miami is the only city that did not have an active syringe/needle exchange program at the time of the study.(126). Needle exchange has been recently shown to reduce needle sharing and HIV incidence among injection drug use (127); notably the 1984-1994 expansion of needle exchange and syringe exchange has been credited with the steep reduction of HIV infection among injection drug users

living in New York City (128). The longtime federal ban of needle exchange programs was modified early during the Obama administration in 2009 which designated that federal monies can be used to establish syringe exchange programs in any location that local public health or law enforcement agencies designate as appropriate. Overall, the results of this study highlight the continued need regarding keeping an open dialogue regarding the prevalence of injection drug use in Miami, HIV risk reduction and the possibility of implementing syringe exchange programs. Having no syringe exchange program may be indicative of an environment that is less accepting and less receptive to injection drug users. Furthermore, this less welcoming environment may permeate services that injection drug users may access, such as medical or housing, resulting in negative encounters, which may in turn encourage secrecy regarding injection drug use. It is possible that the advent of open syringe exchange provision within a city increases the socio-cultural awareness regarding sero-injection drug use thereby increasing the self-efficacy to disclose drug use to one's provider. However, it is important to note that the Project INSPIRE research study did not specifically assess the prevalence and use of syringe exchange programs nor control for individual site-level differences; hence the associated suggestions should be seen as exploratory.

In presenting the above findings, several study limitations should be noted. Most notably, the study was not specifically designed to target self-efficacy to disclose drug use to one's HIV primary care provider and as such a comprehensive inventory of appropriate correlates was not collected as part of the parent study. For example, it might have been interesting to examine whether participants' previous experiences with their

providers regarding being prescribed with antiretroviral therapy was related to the DISDR dependent variable. Second, this study relied on self-report data regarding many of the independent variables. Thus, the reporting of stigmatized behaviors such as lending/sharing needles and paraphernalia with HIV-negative and unknown status injection partners may have been underreported. Also, the reports of injection drug use may be underreported because of socially desirability response biases. To diminish this concern, the INSPIRE study used computerized data collection methods which have been shown to enhance reporting of sensitive risk behaviors among IDU sample. Third, loss to follow up might serve to alter findings regarding potential differences between participants that completed all assessments versus those that did not. However, INSPIRE's high follow up rates decrease concern on this limitation. The large number of comparisons could have resulted in one or more statistically significant findings being due to chance alone.

Public health impact

In sum, HIV disease remains a chronic yet manageable disease that disproportionally impacts marginalized populations such as injection drug users. Given the nature of complexities necessary to treat HIV disease within this population it is important to enhance the patient provider relationship to achieve an optimal medication regimen and overall care. An optimal medication regimen can result in decreased co-morbidities, healthcare costs, hospitalizations and improved overall quality of life. Self-efficacy for various health-related behaviors has been successfully targeted by interventions to influence patient health behaviors and enhance patient self-management of their HIV

infection and other possible disease conditions (129). Concurrently, it is important to empower physicians who treat HIV positive drug users with the appropriate training necessary to establish trust and maintain a good patient-provider dialogue regarding disclosure of ongoing drug use in order to prescribe the most appropriate HIV treatment regimen necessary to deliver optimal HIV care. Given the large number of often multiple co-morbidities potentially associated with this population, it would be beneficial for HIV primary care physicians that treat this population to incorporate multiple "team members" (substance abuse counselor, mental health treatment counselor, outreach case management, WIC counselor, HOPWA representative) functioning as part of a holistic treatment team to implement a multi-pronged approach to HIV primary treatment.

Reference List

(1) Grigoryan A, Shouse R, Durant T, Mastro T, Espinoza L, Chen M et al. HIV infection among injection-drug-users- 34 states, 2004-2007. MMWR-Morbidity and Mortality Weekly Report 58[46], 1291-1295. 2009.

(2) Gebo KA, Fleishman JA, Conviser R, Hellinger J, Hellinger FJ, Josephs JS et al. Contemporary costs of HIV healthcare in the HAART era. AIDS 24[17], 2705-2715. 2010.

(3) Gebo KA, Fleishman JA, Moore RD. Hospitalizations for metabolic conditions, opportunistic infections, and injection drug use among HIV patients - Trends between 1996 and 2000 in 12 states. JAIDS-Journal of Acquired Immune Deficiency Syndromes 40[5], 609-616. 2005.

(4) Conover CJ, Weaver M, Ang A, Arno P, Flynn PM, Ettner SL. Costs of care for people living with combined HIV/AIDS, chronic mental illness, and substance abuse disorders. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 21[12], 1547-1U91. 2009.

(5) Fielden S, Rusch MLA, Yip B, Wood E, Shannon K, Levy A et al. Nonadherence increases the risk of hospitalization among HIV-infected antiretroviral Naive patients started on HAART. JIAPAC-Journal of International Association of Physicians in AIDS Care 7[5], 238-244. 2008.

(6) Wood E, Hogg RS, Lima VD, Kerr T, Yip B, Marshall BDL et al. Highly active antiretroviral therapy and survival in HIV-Infected injection drug users. JAMA-Journal of American Medical Association 300[5], 550-554. 2008.

(7) Mizuno Y, Wilkinson JD, Santibanez S, Rose CD, Knowlton A, Handley K et al. Correlates of health care utilization among HIV-seropositive injection drug users. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 18[5], 417-425. 2006.

(8) Wilkinson JD, Zhao W, Arnsten JH, Knowlton AR, Mizuno Y, Shade SB et al. Longitudinal correlates of health care-seeking behaviors among HIV-seropositive injection drug users - How can we intervene to improve health care utilization? JAIDS-Journal of Acquired Immune Deficiency Syndromes 46, S120-S126. 2007.

(9) Knowlton AR, Arnsten JH, Eldred LJ, Wilkinson JD, Shade SB, Bohnert AS et al. Antiretroviral Use Among Active Injection-Drug Users: The role of patient-provider engagement and structural factors. AIDS Patient Care and STDs 2010; 24(7):421-428.

(10) Knowlton AR, Arnsten JH, Gourevitch MN, Eldred L, Wilkinson JD, Rose CD et al. Microsocial environmental influences on highly active antiretroviral therapy outcomes among active injection drug users - The role of informal caregiving and household factors. JAIDS-Journal of Acquired Immune Deficiency Syndromes 46, S110-S119. 2007.

(11) Knowlton AR, Hoover DR, Chung SE, Celentano DD, Vlahov D, Latkin CA. Access to medical care and Service utilization among injection drug users with HIV/AIDS. Drug and Alcohol Dependence 64[1], 55-62. 2001.

(12) Mccoy CB, Metsch LR, Chitwood DD, Miles C. Drug use and barriers to use of health care services. Substance Use & Misuse 36[6-7], 789-806. 2001.

(13) Bruce RD, Kresina TF, Cance-Katz EF. Medication-assisted treatment and HIV/AIDS: aspects in treating HIV-infected drug users. AIDS 24[3], 331-340. 2010.

(14) Kresina TF, Bruce RD, Cance-Katz EF. Medication assisted treatment in the treatment of drug abuse and dependence in HIV/AIDS Infected Drug Users. Current HIV Research 7[4], 354-364. 2009.

(15) Makoul G, Clayman ML. An integrative model of shared decision making in medical encounters. Patient Education and Counseling 60[3], 301-312. 2006.

(16) Fuertes JN, Mislowack A, Bennett J, Paul L, Gilbert TC, Fontan G et al. The physician-patient working alliance. Patient Education and Counseling 66[1], 29-36. 2007.

(17) Purcell DW, Metsch LR, Latka M, Santibanez S, Gomez CA, Eldred L et al. Interventions for seropositive injectors - Research and evaluation - An integrated behavioral intervention with HIV-positive injection drug users to address medical care, adherence, and risk reduction. JAIDS-Journal of Acquired Immune Deficiency Syndromes 37, S110-S118. 2004.

(18) Purcell D, Latka M, Metsch L, Latkin C, Gomez CA, Mizuno Y et al. Results from a randomized controlled trial of a peer-mentoring intervention to reduce HIV transmission and increase access to care and adherence to HIV medications among HIV-seropositive injection drug users. JAIDS-Journal of Acquired Immune Deficiency Syndromes 46[2], S35. 2011.

(19) Johnson MO, Neilands TB, Dilworth SE, Morin SF, Remien RH, Chesney MA. The role of self-efficacy in HIV treatment adherence: Validation of the HIV treatment adherence self-efficacy scale (HIV-ASES). Journal of Behavioral Medicine 30[5], 359-370. 2007.

(20) Clark NM, Dodge JA. Exploring self-efficacy as a predictor of disease management. Health Education & Behavior 26[1], 72-89. 1999.

(21) Bravo P, Edwards A, Rollnick S, Elwyn G. Tough decisions faced by people living with HIV: A literature review of psychosocial problems. AIDS Reviews 12[2], 76-88. 2010.

(22) Purcell DW, Latka MH, Metsch LR, Latkin CA, Gomez CA, Mizuno Y et al. Results from a randomized controlled trial of a peer-mentoring intervention to reduce HIV transmission and increase access to care and adherence to HIV medications among HIV-seropositive injection drug users. JAIDS-Journal of Acquired Immune Deficiency Syndromes 46, S35-S47. 2007.

(23) Battersby M, Davis C, Wagner E. Twelve-evidence-based principles for implementing self-management support in primary care. The Joint Commission Journal on Quality and Patient Safety 36[12], 561-570. 2010.

(24) Sabin CA. The changing clinical epidemiology of AIDS in the highly active antiretroviral therapy era. AIDS 16, S61-S68. 2002.

(25) Zolopa AR. The evolution of HIV treatment guidelines: Current state-of-the-art of ART. Antiviral Research 2010; 85(1):241-244.

(26) Bruce RD, Altice FL. Clinical care of the HIV-infected drug user. Infectious Disease Clinics of North America 21[1], 149-+. 2007.

(27) Lima VD, Harrigan R, Murray M, Moore DM, Wood E, Hogg RS et al. Differential impact of adherence on long-term treatment response among naive HIV-infected individuals. AIDS 22[17], 2371-2380. 2008.

(28) Lima VD, Harrigan R, Bangsberg DR, Hogg RS, Gross R, Yip B et al. The combined effect of modern highly active antiretroviral therapy regimens and adherence on mortality over time. JAIDS-Journal of Acquired Immune Deficiency Syndromes 50[5], 529-536. 2009.

(29) Dodd PJ, Garnett GP, Hallett TB. Examining the promise of HIV elimination by 'test and treat' in hyperendemic settings. AIDS 24, 729-735. 2010.

(30) Wagner BG, Kahn JS, Blower S. Should we try to eliminate HIV epidemics by using a 'Test and Treat' strategy? AIDS 24, 775-776. 2010.

(31) Montaner JSG, Lima VD, Barrios R, Yip B, Wood E, Kerr T et al. Association of highly active antiretroviral therapy coverage, population viral load, and yearly new HIV diagnoses in British Columbia, Canada: a population-based study. Lancet 376[9740], 532-539. 2010.

(32) Paredes R, Clotet B. Clinical management of HIV-1 resistance. Antiviral Research 85[1], 245-265. 2010.

(33) Menendez-Arias L. Molecular basis of human immunodeficiency virus drug resistance: An update. Antiviral Research 85[1], 210-231. 2010.

(34) Weaver MR, Conover CJ, Proescholdbell RJ, Arno PS, Ang A, Ettner SL. Utilization of mental health and substance abuse care for people living with HIV/AIDS, chronic mental illness, and substance abuse disorders. JAIDS-Journal of Acquired Immune Deficiency Syndromes 47[4], 449-458. 2008.

(35) Chander G, Himelhoch S, Fleishman JA, Hellinger J, Gaist P, Moore RD et al. HAART receipt and viral suppression among HIV-infected patients with co-occurring mental illness and illicit drug use. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 21[5], 655-663. 2009.

(36) Mugavero M, Ostermann J, Whetten K, Leserman J, Swartz M, Stangl D et al. Barriers to antiretroviral adherence: The importance of depression, abuse, and other traumatic events. AIDS Patient Care and STDs 20[6], 418-428. 2006.

(37) Kavasery R, Galai N, Astemborski J, Lucas GM, Celentano DD, Kirk GD et al. Nonstructured treatment interruptions among injection drug users in Baltimore, MD. JAIDS-Journal of Acquired Immune Deficiency Syndromes 50[4], 360-366. 2009.

(38) Malta M, Magnanini MMF, Strathdee SA, Bastos FI. Adherence to antiretroviral therapy among HIV-infected drug users: A Meta-Analysis. AIDS and Behavior 14[4], 731-747. 2010.

(39) Altice F, Bruce D, Lucas G, Lum P, Korthuis T, Flanigan T et al. HIV treatment outcomes among HIV-infected, opiod-dependent patients receiving buprenorphine/naloxone treatment within HIV clinical care settings: results from a multisite study. JAIDS-Journal of Acquired Immune Deficiency Syndromes . 2011.

(40) Bruce RD, Cance-Katz E, Kharasch ED, Moody DE, Morse GD. Pharmacokinetic interactions between buprenorphine and antiretroviral medications. Clinical Infectious Diseases 43, S216-S223. 2006.

(41) Bruce RD, Altice FL. Three case reports of a clinical pharmacokinetic interaction with buprenorphine and atazanavir plus ritonavir. AIDS 20[5], 783-784. 2006.

(42) Pettes T, Wood E, Guillemi S, Lai C, Montaner J, Kerr T. Methadone use among HIV-positive injection drug users in a Canadian setting. Journal of Substance Abuse Treatment 39[2], 174-179. 2010.

(43) Uhlmann S, Milloy MJ, Kerr T, Zhang R, Guillemi S, Marsh D et al. Methadone maintenance therapy promotes initiation of antiretroviral therapy among injection drug users. Addiction 105[5], 907-913. 2010.

(44) Cook JA, Burke-Miller JK, Cohen MH, Cook RL, Vlahov D, Wilson TE et al. Crack cocaine, disease progression, and mortality in a multicenter cohort of HIV-1 positive women. AIDS 22[11], 1355-1363. 2008.

(45) Baum MK, Rafie C, Lai S, Sales S, Page B, Campa A. Crack-cocaine use accelerates HIV disease progression in a cohort of HIV-positive drug users. JAIDS-Journal of Acquired Immune Deficiency Syndromes 50[1], 93-99. 2009.

(46) Lucas G. Substance abuse, adherence with antiretroviral therapy, and clinical outcomes. Life Sciences . 2010.

(47) Korthius P, Fiellin D, Fu R, Lum P, Altice F, Sohler N et al. Improving adherence to HIV quality of care indicators in persons with opiod dependence: The role of Buprenorphine. JAIDS-Journal of Acquired Immune Deficiency Syndromes 56[1], S83. 2011.

(48) Giordano TP, Gifford AL, White AC, Suarez-Almazor ME, Rabeneck L, Hartman C et al. Retention in care: A challenge to survival with HIV infection. Clinical Infectious Diseases 44[11], 1493-1499. 2007.

(49) Department of Health and Human Services. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. Department of Health and Human Services . 2011.

(50) Korthuis PT, Josephs JS, Fleishman JA, Hellinger J, Himelhoch S, Chander G et al. Substance abuse treatment in human immunodeficiency virus: The role of patient-provider discussions. Journal of Substance Abuse Treatment 35[3], 294-303. 2008.

(51) Strike CJ, Myers T, Millson M. Finding a place for needle exchange programs. Critical Public Health 14[3], 261-275. 2004.

(52) Preau M, Leport C, Villes V, Michelet C, Collin F, Carrieri MP et al. Prevalence and predictors of deterioration of a trustful patient-provider relationship among HIV-Infected persons treated with antiretroviral therapy. JAIDS-Journal of Acquired Immune Deficiency Syndromes 47[4], 467-471. 2008.

(53) Saha S, Jacobs EA, Moore RD, Beach MC. Trust in physicians and racial disparities in HIV care. AIDS Patient Care and STDs 24[7], 415-420. 2010.

(54) Loughlin A, Metsch L, Gardner L, nderson-Mahoney P, Barrigan M, Strathdee S. Provider barriers to prescribing HAART to medically-eligible HIV-infected drug users. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 16[4], 485-500. 2004.

(55) Bogart LM, Catz SL, Kelly JA, Benotsch EG. Factors influencing physicians' judgments of adherence and treatment decisions for patients with HIV disease. Medical Decision Making 21[1], 28-36. 2001.

(56) Bogart LM, Kelly JA, Catz SL, Sosman JM. Impact of medical and nonmedical factors on physician decision making for HIV/AIDS antiretroviral treatment. Journal of Acquired Immune Deficiency Syndromes 23[5], 396-404. 2000.

(57) Strathdee SA, Palepu A, Cornelisse PGA, Yip B, O'Shaughnessy MV, Montaner JSG et al. Barriers to use of free antiretroviral therapy in injection drug users. JAMA-Journal of American Medical Association 280[6], 547-549. 1998.

(58) Gerbert B, Maguire BT, Bleecker T, Coates TJ, Mcphee SJ. Primary care physicians and Aids - attitudinal and structural barriers to Care. JAMA-Journal of American Medical Association 266[20], 2837-2842. 1991.

(59) Ding L, Landon BE, Wilson IB, Wong MD, Shapiro MF, Cleary PD. Predictors and consequences of negative physician attitudes toward HIV-infected injection drug users. Archives of Internal Medicine 165[6], 618-623. 2005.

(60) Werb D, Mills EJ, Montaner JSG, Wood E. Risk of resistance to highly active anti retroviral therapy among HIV-positive injecting drug users: a meta-analysis. Lancet Infectious Diseases 10[7], 464-469. 2010.

(61) Cofrancesco J, Scherzer R, Tien PC, Gibert CL, Southwell H, Sidney S et al. Illicit drug use and HIV treatment outcomes in a US cohort. AIDS 22[3], 357-365. 2008.

(62) Vassilev ZP, Hagan H. Highly active antiretroviral therapy for injection drug users: physician-recommended strategies for enhanced adherence. Antiviral Therapy 9[3], 461. 2004.

(63) Marks R, Allegrante J, Lorig KR. A review and synthesis of research evidence for self-efficacy-enhancing interventions for reducing chronic disability: Implications for health education practice (Part II). Health Promotion Practice 6[2], 148. 2005.

(64) Mallinson RK, Rajabiun S, Coleman S. The provider role in client engagement in HIV care. AIDS Patient Care and STDs 21, S77-S84. 2007.

(65) Cronquist A, Edwards V, Galea S, Latka M, Vlahov D. Health care utilization among young adult injection drug users in Harlem, New York. Journal of Substance Abuse 13[1-2], 17-27. 2001.

(66) Neale J, Tompkins C, Sheard L. Barriers to accessing generic health and social care services: a qualitative study of injecting drug users. Health & Social Care in the Community 16[2], 147-154. 2008.

(67) Lert F, Kazatchkine MD. Antiretroviral HIV treatment and care for injecting drug users: An evidence-based overview. International Journal of Drug Policy 18[4], 255-261. 2007.

(68) Knowlton AR, Hua W, Latkin C. Social support networks and medical service use among HIV-positive injection drug users: Implications to intervention. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 17[4], 479-492. 2005.

(69) Nijhawan A, Kim S, Rich J. Management of HIV infection in patients with substance use problems. National Institutes of Health 10[5], 432-438. 2008.

(70) Marshall BDL, Wood E. Toward a comprehensive approach to HIV prevention for people who use drugs. JAIDS-Journal of Acquired Immune Deficiency Syndromes 55, S23-S26. 2010.

(71) Cheever LW. Engaging HIV-infected patients in care: Their lives depend on it. Clinical Infectious Diseases 44[11], 1500-1502. 2007.

(72) Arnsten JH, Demas PA, Grant RW, Gourevitch MN, Farzodegan H, Howard AA et al. Impact of active drug use on antiretroviral therapy adherence and viral suppression in HIV-infected drug users. Journal of General Internal Medicine 2002; 17(5):377-381.

(73) Hinkin CH, Barclay TR, Castellon SA, Levine AJ, Durvasula RS, Marion SD et al. Drug use and medication adherence among HIV-1 infected individuals. AIDS and Behavior 11[2], 185-194. 2007.

(74) Sullivan PS, Campsmith ML, Nakamura GV, Begley EB, Schulden J, Nakashima AK. Patient and regimen characteristics associated with self-reported nonadherence to antiretroviral therapy. Plos One 2[6]. 2007.

(75) Celentano DD, Lucas G. Optimizing treatment outcomes in HIV-infected patients with substance abuse issues. Clinical Infectious Diseases 45, S318-S323. 2007.

(76) Celentano DD, Vlahov D, Cohn S, Shadle VM, Obasanjo O, Moore RD. Self-reported antiretroviral therapy in injection drug users. JAMA-Journal of American Medical Association 280[6], 544-546. 1998.

(77) Hicks PL, Mulvey KP, Chander G, Fleishman JA, Josephs JS, Korthuis PT et al. The impact of illicit drug use and substance abuse treatment on adherence to HAART. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 19[9], 1134-1140. 2007.

(78) Small W, Wood E, Betteridge G, Montaner J, Kerr T. The impact of incarceration upon adherence to HIV treatment among HIV-positive injection drug users: a qualitative study. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 21[6], 708-714. 2009.

(79) Kerr T, Marshall A, Walsh J, Palepu A, Tyndall M, Montaner J et al. Determinants of HAART discontinuation among injection drug users. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 17[5], 539-549. 2005.

(80) Sharpe TT, Lee LM, Nakashima AK, Elam-Evans LD, Fleming PL. Crack cocaine use and adherence to antiretroviral treatment among HIV-infected black women. Journal of Community Health 29[2], 117-127. 2004.

(81) Cohen MH, Cook JA, Grey D, Young M, Hanau LH, Tien P et al. Medically eligible women who do not use HAART: The importance of abuse, drug use, and race. American Journal of Public Health 94[7], 1147-1151. 2004.

(82) Knowlton A, Arnsten J, Eldred L, Wilkinson J, Gourevitch M, Shade S et al. Individual, interpersonal, and structural correlates of effective HAART use among urban active injection drug users. JAIDS-Journal of Acquired Immune Deficiency Syndromes 41[4], 486-492. 2006.

(83) Siegel K, Karus D, Schrimshaw EW. Racial differences in attitudes toward protease inhibitors among older HIV-infected men. AIDS Care-Psychological and Socio-Medical Aspects of AIDS/HIV 12[4], 423-434. 2000.

(84) Kapadia F, Vlahov D, Wu Y, Cohen MH, Greenblatt RM, Howard AA et al. Impact of drug abuse treatment modalities on adherence to ART/HAART among a cohort of HIV seropositive women. American Journal of Drug and Alcohol Abuse 34[2], 161-170. 2008.

(85) Berg K, Litwin A, Li X, Heo M, Arnstein J. Directly observed antiretroviral therapy improves adherence and viral load in drug users attending methadone maintenance clinics: A randomized controlled trial. Drug and Alcohol , 192-199. 2011.

(86) Moatti JP, Carrieri MP, Spire B, Gastaut JA, Cassuto JP, Moreau J. Adherence to HAART in French HIV-infected injecting drug users: the contribution of buprenorphine drug maintenance treatment. AIDS 14[2], 151-155. 2000.

(87) Sherer R. Adherence and antiretroviral therapy in injection drug users. JAMA-Journal of American Medical Association 280[6], 567-568. 1998.

(88) Friedland G, Vlahov D. Integration of buprenorphine for substance-abuse treatment by HIV care providers. JAIDS-Journal of Acquired Immune Deficiency Syndromes 56[1], S1. 2011.

(89) Cheever LW, Kresina TF, Cajina A, Lubran R. A model federal collaborative to increase patient access to buprenorphine treatment in HIV primary care. JAIDS-Journal of Acquired Immune Deficiency Syndromes 56[1], S3-S6. 3-1-2011.

(90) Finkelstein R, Netherland J, Sylla L, Gourevitch M, Cajina A, Cheever L. Policy implications of integrating buprenorphine/naloxone treatment and HIV care. JAIDS-Journal of Acquired Immune Deficiency Syndromes 56, S98. 2011.

(91) Spire B, Lucas GM, Carrieri MP. Adherence to HIV treatment among IDUs and the role of opiod substitution treatment (OST). International Journal of Drug Policy 18, 262-270. 2007.

(92) Sullivan LE, Bruce RD, Haltiwanger D, Lucas GM, Eldred L, Finkelstein R et al. Initial strategies for integrating buprenorphine into HIV care settings in the United States. Clinical Infectious Diseases 43, S191-S196. 2006.

(93) Roux P, Carrieri MP, Villes V, Dellamonica P, Poizot-Martin I, Ravaux I et al. The impact of methadone or buprenorphine treatment and ongoing injection on highly active antiretroviral therapy (HAART) adherence: evidence from the MANIF2000 cohort study. Addiction 103[11], 1828-1836. 2008.

(94) Roux P, Carrieri MP, Cohen J, Ravaux I, Poizot-Martin I, Dellamonica P et al. Retention in opioid substitution treatment: A major predictor of long-term virological success for HIV-infected injection drug users receiving antiretroviral treatment. Clinical Infectious Diseases 49[9], 1433-1440. 2009.

(95) Chaudhry A, Botsko M, Weiss L, Egan J, Mitty J, Estrada B et al. Participant characteristics and HIV risk behaviors among individuals entering integrated buprenorphine/naloxone and HIV care. JAIDS-Journal of Acquired Immune Deficiency Syndromes 56[1], S14. 2011.

(96) Wilkinson J, Zhao W, Santibanez S, Arnsten J, Knowlton A, Gomez CA et al. Providers' HIV prevention discussions with HIV-seropositive injection drug users. AIDS and Behavior 10[6], 699-705. 2006.

(97) Beach MC, Keruly J, Moore RD. Is the quality of the patient-provider relationship associated with better adherence and health outcomes for patients with HIV? Journal of General Internal Medicine 21[6], 661-665. 2006.

(98) Johnson MO, Chesney MA, Goldstein RB, Remien RH, Catz S, Gore-Felton C et al. Positive provider interactions, adherence self-efficacy, and adherence to antiretroviral medications among HIV-infected adults: A mediation model. AIDS Patient Care and STDs 20[4], 258-268. 2006.

(99) Wilson IB, Kaplan S. Physician-patient communication in HIV disease: The importance of patient, physician, and visit characteristics. Journal of Acquired Immune Deficiency Syndromes 25[5], 417-425. 2000.

(100) Schneider J, Kaplan SH, Greenfield S, Li WJ, Wilson IB. Better physician-patient relationships are associated with higher reported adherence to antiretroviral therapy in patients with HIV infection. Journal of General Internal Medicine 19[11], 1096-1U34. 2004.

(101) Bandura A, Adams N. Analysis of self-efficacy theory of behavioral change. Cognitive therapy and research 1[4], 287-310. 1977.

(102) Bandura A. Perceived self-efficacy in the exercise of control over Aids infection. Evaluation and Program Planning13, 9-17, 1990.

(103) Lorig KR, Holman HR. Self-management education: History, definition, outcomes, and mechanisms. Annals of Behavioral Medicine 26[1], 1-7. 2003.

(104) Sarkar U, Fisher L, Schillinger D. Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy? Diabetes Care 29[4], 823-829. 2006.

(105) Chlebowy DO, Garvin BJ. Social support, self-efficacy, and outcome expectations - Impact on self-care behaviors and glycemic control in Caucasian and African American adults with type 2 diabetes. Diabetes Educator 32[5], 777-786. 2006.

(106) Montaner JSG, Wood E, Kerr T, Lima V, Barrios R, Shannon K et al. Expanded highly active antiretroviral therapy coverage among HIV-positive drug users to improve individual and public health outcomes. JAIDS-Journal of Acquired Immune Deficiency Syndromes 55, S5-S9. 2010.

(107) Kelly JA MDSKea. Randomised, controlled, community-level HIV-prevention intervention for sexual-risk behaviour among homosexual men in US cities. Lancet 350, 1500-1505. 1997.

(108) Bandura A. Social Foundations of Thought and Actions. Englewood Cliffs, NJ: Prentice-Hall, 1986.

(109) Latkin CA SSKA. HIV prevention among drug users: outcome of a network-oriented peer outreach intervention. Health Psychology 22, 332-339. 2003.

(110) Fisher JD&FWA. Changing AIDS-risk behavior. Psychological Bulletin 111, 455-474. 2011.

(111) Maru DSR, Bruce RD, Walton M, Mezger JA, Springer SA, Shield D et al. Initiation, adherence, and retention in a randomized controlled trial of directly administered antiretroviral therapy. AIDS and Behavior 12[2], 284-293. 2008.

(112) Bakken S, Holzemer WL, Brown MA, Powell-Cope GM, Turner JG, Inouye J et al. Relationships between perception of engagement with health care provider and demographic characteristics, health status, and adherence to therapeutic regimen in persons with HIV/AIDS. AIDS Patient Care and STDs 14[4], 189-197. 2000.

(113) Rogers ES., Chamberlin J, Ellison ML, Crean T. A consumer-constructed scale to measure empowerment among users of mental health services. Psychiatric Services 48[8], 1042-1047. 2011.

(114) Barrera MA. A method for assessing social support networks in community survey research. Connections 3, 48-53. 2011.

(115) Derogatis LR, Spencer PM. The Brief Symptom Inventory: Administration, scoring, and procedural manual. Baltimore, MD: John Wiley, 1982.

(116) Lemeshow S, Hosmer D. A review of goodness of fit statistics for use in the development of logistic regression models. American Journal of Epidemiology 115[1], 92-106. 1981.

(117) Cui J. QIC program and model selection in GEE analyses. Stata Journal 7[2], 209-220. 2007.

(118) Pan W. Akaike's information criterion in generalized estimating equations. Stata Journal 57, 120-125. 2001.

(119) Cervone D. Thinking about self-efficacy. Behavior Modification 24[1], 30-56. 2000.

(120) Lorig KR, Holman HR. Self-management education: history, definition, outcomes, and mechanisms. Annals of Behavioral Medicine 26[1], 1-7. 2003.

(121) Koenig LJ, Pals SL, Bush T, Palmore MP, Stratford D, Ellerbrock TV. Randomized controlled trial of an intervention to prevent adherence failure among HIV-Infected patients initiating Antiretroviral therapy. Health Psychology 27[2], 159-169. 2008.

(122) Rosland A, Piette JD. Emerging models for mobilizing family support for chronic disease management: a structured review. Chronic Illness 6[1], 17-21. 2010.

(123) Rosland A, Piette JD, Choi HJ, Heisler M. Family and friend participation in primary care visits of patients with diabetes or heart failure. Medical Care 49[1], 37-45. 2011.

(124) Levahot K, Huh D, Walters KL, King KM, Andrasik MP, Simoni JM. Buffering effects of general and medication-specific social support on the association between substance abuse and HIV medication adherence. AIDS Patient Care and STDs 25[3], 181-189. 2011.

(125) Whetten K, Leserman J, Whetten R, Ostermann J, Thielman N, Swartz M et al. Exploring lack of trust in care providers and the government as a barrier to health service use. American Journal of Public Health 96[4], 716-721. 2006.

(126) Kaiser Family Foundation. Sterile Syringe Exchange Programs. Kaiser Family Foundation . 2011.

(127) Kerr T, Small W, Buchner C, Zhang R, Li K, Montaner J S.G. et al. Syringe sharing and HIV incidence among injection drug users and increased access to sterile syringes. American Journal of Public Health 100[8], 1449-1453. 2010.

(128) Heller D, Paone D. Access to sterile syringes for injecting drug users in New York City: politics and perception (1984-2010). Substance Use & Misuse 46[2-3], 140-149. 2011.

(129) Jerant A, Kravitz RL, Azari R, White L, Garcia JA, Vierra H et al. Training residents to employ self-efficacy-enhancing interviewing techniques: randomized controlled trial of a standardized patient intervention. Journal of General Internal Medicine 24[5], 606-613. 2009.

Table 1. Characteristics of Study Sample at Baseline, 6 Months, and 12 months: Frequencies and P-values

	Baseline Frequency(%)	N	6 month FU Frequency(%)	N	12 month FU Frequency(%)	N	p value*
Treatment group							0.667
Control	402 (49.4%)		323 (50.2%)		285 (47.7%)		
Treatment	412 (50.6%)	814	321 (49.8%)	644	313 (52.3%)	598	
Age							0.4
<40 years	261 (32.1%)		194 (30.1%)		172 (28.8%)		
>=40 years	553 (67.9%)	814	450 (69.9%)	644	426 (71.2%)	598	
Race/ethnicity							0.982
Non-Hispanic white	73 (9.2%)		60 (9.5%)		61 (10.4%)		
Non-Hispanic black	537 (67.3%)		423 (67.0%)		393 (67.1%)		
Hispanic	124 (15.5%)		101 (16.0%)		86 (14.7%)		
Non-Hispanic other	64 (8.0%)	798	47 (7.5%)	631	46 (7.9%)	586	
Biological sex							0.685
Biological Female	295 (36.2%)		242 (37.6%)		230 (38.5%)		
Biological Male	519 (63.8%)	814	402 (62.4%)	644	368 (61.5%)	598	
Education							0.929
8th grade or less	124 (15.3%)		92 (14.3%)		80 (13.5%)		
Some high school, no diploma	216 (26.6%)		175 (27.2%)		163 (27.4%)		
High school diploma or G.E.D.	264 (32.5%)		218 (33.9%)		191 (32.2%)		
Any college or graduate degree	208 (25.6%)	812	158 (24.6%)	643	160 (26.9%)	594	

Table 1. Characteristics of Study Sample at Baseline, 6 Months, and 12 months: Frequencies and P-values

	Baseline Frequency(%)	N	6 month FU Frequency(%)	N	12 month FU Frequency(%)	N	p value*
Personal annual income							0.633
<$5,000	414 (51.8%)		311 (49.2%)		295 (50.5%)		
>=$5,000	386 (48.3%)	800	321 (50.8%)	632	289 (49.5%)	584	
Site							0.6
Baltimore	229 (28.1%)		183 (28.4%)		152 (25.4%)		
Miami	201 (24.7%)		142 (22.1%)		135 (22.6%)		
New York	188 (23.1%)		155 (24.1%)		145 (24.3%)		
San Francisco	196 (24.1%)	814	164 (25.5%)	644	166 (27.8%)	598	
Homelessness in past year							<.001
No	559 (68.9%)		0.00%		473 (79.5%)		
Yes	252 (31.1%)	811	0.00%		122 (20.5%)	595	
Lifetime history of incarceration							0.921
No	232 (28.6%)		190 (29.6%)		171 (28.9%)		
Yes	578 (71.4%)	810	452 (70.4%)	642	421 (71.1%)	592	

Table 1. Characteristics of Study Sample at Baseline, 6 Months, and 12 months: Frequencies and P-values

	Baseline Frequency(%)	N	6 month FU Frequency(%)	N	12 month FU Frequency(%)	N	p value*
Current health insurance: Medicaid or MediCAL							0.213
No	351 (46.8%)		286 (46.3%)		249 (42.3%)		
Yes	399 (53.2%)	750	332 (53.7%)	618	340 (57.7%)	589	
Current health insurance: Medicare							0.544
No	535 (71.3%)		425 (68.8%)		408 (69.3%)		
Yes	215 (28.7%)	750	193 (31.2%)	618	181 (30.7%)	589	
Current health insurance: Private or HMO							0.271
No	704 (93.9%)		570 (92.2%)		540 (91.7%)		
Yes	46 (6.1%)	750	48 (7.8%)	618	49 (8.3%)	589	
Current health insurance: V.A. or CHAMPUS							0.371
No	716 (95.5%)		595 (96.3%)		571 (96.9%)		
Yes	34 (4.5%)	750	23 (3.7%)	618	18 (3.1%)	589	
Current health insurance: None							<.001
No	605 (80.7%)		534 (86.4%)		519 (88.1%)		
Yes	145 (19.3%)	750	84 (13.6%)	618	70 (11.9%)	589	

Table 1. Characteristics of Study Sample at Baseline, 6 Months, and 12 months: Frequencies and P-values

	Baseline Frequency(%)	N	6 month FU Frequency(%)	N	12 month FU Frequency(%)	N	p value*
Self perceived health status in the past 6 months							<.001
Excellent or Very Good	198 (24.3%)		244 (38.0%)		233 (39.0%)		
Good	301 (37.0%)		214 (33.3%)		190 (31.8%)		
Fair or Poor	315 (38.7%)	814	185 (28.8%)	643	175 (29.3%)	598	
Total Number of Primary Healthcare visits in the past 6 months							<.001
None	84 (10.4%)		0.00%		0.00%		
Three	335 (41.5%)		307 (47.9%)		271 (45.9%)		
Six	280 (34.7%)		249 (38.9%)		238 (40.3%)		
Twelve	70 (8.7%)		56 (8.7%)		56 (9.5%)		
More than Twelve	39 (4.8%)	808	29 (4.5%)	641	26 (4.4%)	591	
Currently taking HIV medications							0.35
No	295 (36.2%)		254 (39.4%)		215 (36.0%)		
Yes	519 (63.8%)	814	390 (60.6%)	644	383 (64.1%)	598	
Any admission to a hospital for drug treatment or detox in the past 6 months							
No	535 (66.1%)		515 (80.6%)		496 (82.9%)		
Yes	274 (33.9%)	809	124 (19.4%)	639	102 (17.1%)	598	
Receiving any of the 3 substance treatment programs (hospital, outpatient, and MMT) in the past 6 months							
No	296 (36.5%)		281 (43.9%)		294 (49.2%)		

Table 1. Characteristics of Study Sample at Baseline, 6 Months, and 12 months: Frequencies and P-values

	Baseline Frequency(%)	N	6 month FU Frequency(%)	N	12 month FU Frequency(%)	N	p value*
Frequency of alcohol use in past 3 months							<.001
Every day or up to 2-6 per week	322 (39.8%)		152 (23.6%)		126 (21.1%)		
Once a week to less than once a month	271 (33.5%)		211 (32.8%)		182 (30.5%)		
Never	217 (26.8%)	810	281 (43.6%)	644	289 (48.4%)	597	
Used crack in the past 3 months							<.001
non-drug user	209 (26.0%)		348 (54.6%)		341 (57.1%)		
used drugs other than crack	206 (25.6%)		106 (16.6%)		95 (15.9%)		
used crack	389 (48.4%)	804	184 (28.8%)	638	161 (27.0%)	597	
Any needle lending or sharing of cooker, cotton, or rinse water with at least one HIV-/? injection partner							
No	576 (72.3%)		585 (91.7%)		560 (94.6%)		
Yes	221 (27.7%)	797	53 (8.3%)	638	32 (5.4%)	592	
Any unprotected vaginal or anal sex with HIV-/? Partner							<.001
No	594 (74.9%)		559 (89.0%)		526 (89.2%)		
Yes	199 (25.1%)	793	69 (11.0%)	628	64 (10.9%)	590	
Patient provider relationship							0.505
1 to 2	30 (3.7%)		26 (4.1%)		20 (3.4%)		
>2 to <=3	132 (16.3%)		84 (13.1%)		86 (14.4%)		
>3 to <=4	648 (80.0%)	810	530 (82.8%)	640	491 (82.2%)	597	

Table 1. Characteristics of Study Sample at Baseline, 6 Months, and 12 months: Frequencies and P-values

	Baseline Frequency(%)	N	6 month FU Frequency(%)	N	12 month FU Frequency(%)	N	p value*
Taking control of healthcare							0.177
1 to 2	50 (6.2%)		34 (5.3%)		38 (6.4%)		
>2 to <=3	517 (63.6%)		401 (62.3%)		344 (57.6%)		
>3 to <=4	246 (30.3%)	813	209 (32.5%)	644	215 (36.0%)	597	
Empowerment							0.236
1 to 2	3 (0.4%)		4 (0.6%)		3 (0.5%)		
>2 to <=3	580 (72.6%)		432 (67.9%)		399 (67.6%)		
>3 to <=4	216 (27.0%)	799	200 (31.5%)	636	188 (31.9%)	590	
Responsibility							0.569
1 to 2	7 (0.9%)		12 (1.9%)		10 (1.7%)		
>2 to <=3	37 (4.6%)		25 (3.9%)		29 (4.9%)		
>3 to <=4	296 (36.4%)		236 (36.9%)		202 (34.0%)		
>4 to <=5	473 (58.2%)	813	367 (57.3%)	640	354 (59.5%)	595	
Social Support							0.423
1 to 2	22 (2.7%)		14 (2.2%)		16 (2.7%)		
>2 to <=3	113 (13.9%)		75 (11.7%)		65 (10.9%)		
>3 to <=4	238 (29.3%)		179 (27.9%)		161 (27.0%)		
>4 to <=5	439 (54.1%)	812	374 (58.3%)	642	354 (59.4%)	596	
BSI Depression							0.049
1 to 2	493 (60.6%)		439 (68.2%)		402 (67.2%)		
>2 to <=3	208 (25.6%)		141 (21.9%)		133 (22.2%)		
>3 to <=4	88 (10.8%)		48 (7.5%)		46 (7.7%)		

Table 2. Characteristics of Study Sample at Baseline, 6 Months, and 12 months: Means and Standard Deviations

	Baseline		6 months		12 months	
	N	Mean (S. D.)	N	Mean (S. D.)	N	Mean (S. D.)
Age	814	42.6 (6.5)	644	42.8 (6.5)	598	43.1 (6.4)
Self perceived health status in the past 6 months						
	814	3.1 (1.0)	643	2.8 (1.0)	598	2.8 (1.1)
Time since HIV Diagnosis (years)	810	9.3 (5.0)	641	9.5 (5.1)	597	9.3 (5.1)
Total Number of Primary Healthcare visits in the past 6 months						
	808	4.9 (6.9)	641	5.5 (7.4)	591	5.8 (8.6)
Biological CD4	796	376 (284)	613	380 (284)	561	367 (286)
Biological viral load	793	71246 (336793)	606	79507 (437514)	557	65601 (218250)
Patient provider relationship	810	3.5 (0.6)	640	3.6 (0.6)	597	3.6 (0.6)
Taking control of healthcare	813	3.0 (0.5)	644	3.0 (0.5)	597	3.0 (0.6)
Satisfaction with quality of care at last primary care visit						
	813	1.6 (0.7)	643	1.6 (0.8)	595	1.6 (0.7)
Empowerment	799	2.9 (0.3)	636	2.9 (0.3)	590	2.9 (0.3)
Self Efficacy for Disclosing Drug Use to Provider						
	814	3.9 (0.9)	644	4.0 (0.8)	598	4.0 (0.8)
Social Support	812	4.1 (0.9)	642	4.2 (0.8)	596	4.2 (0.9)
BSI Depression	813	2.0 (0.9)	644	1.9 (0.9)	598	1.9 (0.9)

Table 3. Association between "DISDR" and Independent variables at Baseline, 6 Months, and 12 months: Univariate Regression Coefficients

	OR	95% C.I.	p value	N
Used drugs other than crack	0.677	(0.421, 1.090)		
Used crack	0.677	(0.457, 1.005)		
Psychosocial characteristics				
Patient provider relationship	1.762	(1.315, 2.360)	<0.001	597
Talked with provider about safer drug use at last primary care visit				
	0.663	(0.468, 0.938)	0.02	595
Taking control of healthcare	2.199	(1.616, 2.993)	<0.001	597
Empowerment	4.792	(2.514, 9.133)	<0.001	590
Responsibility	1.571	(1.237, 1.996)	<0.001	595
Social Support	1.922	(1.561, 2.367)	<0.001	596
BSI Depression	0.784	(0.652, 0.944)	0.01	598
Parent study outcomes				
Any needle lending or sharing of cooker, cotton, or rinse water with at least one HIV-/? injection partner				
	1.071	(0.441, 1.979)	0.858	592
Any unprotected vaginal or anal sex with HIV-/? Partner				
	1.829	(1.081, 3.094)	0.024	590
Total Number of Primary Healthcare visits in the past 6 months				
Less than 2 visits	1		0.755	591
2 visits or more	0.0.913	(0.516, 1.616)		
Total Number of Primary Healthcare visits in the past 6 months				
Less than 2 visits	1		0.755	591
2 visits or more	0.0.913	(0.516, 1.616)		

Table 4. Multivariate Logistic Analysis of Predictors of Self-Efficacy to Disclose Drug Use to a Provider (n=774) Full Model at Baseline

	Odds Ratio (O.R.)	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)	Significance
Intercept	0.000	5.404	4.73E+09	<.0001
Non-Hispanic White	0.652	0.373	1.138	0.133
Non-Hispanic Black	0.672	0.337	1.341	0.259
Hispanic	0.748	0.340	1.647	0.471
Age >=40 years	1.107	0.771	1.591	0.582
High school graduate or more	0.714	0.503	1.013	0.059
Personal annual income <5000	1.052	0.747	1.482	0.771
Biological sex	1.110	0.779	1.581	0.565
Miami	0.421	0.259	0.687	0.001
New York	0.732	0.430	1.245	0.249
San Francisco	0.790	0.481	1.298	0.353
Perceived health in the past six months	0.861	0.722	1.026	0.094
Two or more HIV visits past 6 months	0.953	0.637	1.425	0.814
Currently taking HIV meds	0.612	0.431	0.869	0.006
Admission to a hospital for drug treatment	1.106	0.716	1.707	0.650
Any substance abuse treatment past 6 months	1.320	0.871	2.002	0.191
Frequency of alcohol use in the past 3 months	0.953	0.652	1.395	0.805
Frequency of alcohol use in the past 3 months	0.942	0.600	1.477	0.794
Used non-injected drugs but not crack cocaine in the past 3 months	0.718	0.454	1.137	0.158
Used non-injected drugs and crack cocaine in the past 3 months	0.795	0.520	1.217	0.292
Patient provider relationship	1.945	1.446	2.616	<.0001
Taking control of healthcare	1.785	1.298	2.455	0.000
Empowerment	1.718	0.838	3.524	0.140
Social Support	1.616	1.306	1.998	<.0001

Table 5. Multivariate Logistic Analysis of Predictors of Self-Efficacy to Disclose Drug Use to a Provider (n=791) Reduced Model

	Odds Ratio (O.R.)	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)	Significance
Intercept	0.007	2.257	3.35+e15	<.0001
Non-Hispanic White	0.676	0.393	1.165	0.159
Non-Hispanic Black	0.664	0.337	1.31	0.237
Hispanic	0.824	0.384	1.766	0.619
Age >=40 years	1.04	0.731	1.479	0.827
High school graduate or more	0.778	0.555	1.09	0.144
Personal annual income <5000	1.027	0.739	1.427	0.875
Biological sex	1.187	0.846	1.665	0.321
Miami	0.452	0.291	0.702	0.000
New York	0.777	0.478	1.263	0.308
San Francisco	0.826	0.518	1.316	0.421
Currently taking HIV medications	0.58	0.414	0.812	0.002
Any substance abuse treatment past 6 months	1.464	1.046	2.047	0.026
Patient provider relationship	1.981	1.502	2.613	<.0001
Taking control of healthcare	1.789	1.323	2.419	0.000
Social support	1.600	1.323	1.935	<.0001

Table 6. Longitudinal Analysis of Correlates of Self-Efficacy to Disclose Drug Use to a Provider (n=1923) Full Model

	Adjusted Odds Ratio (O.R.)	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)	Significance
Intercept	0.017	0.005	0.065	<.0001
Condition	0.814	0.645	1.028	0.083
Assessment- Baseline	0.901	0.714	1.136	0.378
Assessment- 6 months	0.806	0.639	1.017	0.069
Assessment- 12 months	1.000	1.000	1.000	.
Non-Hispanic White	1.289	0.698	2.380	0.417
Non-Hispanic Black	1.011	0.623	1.640	0.966
Hispanic	0.762	0.439	1.323	0.335
Non-Hispanic other (ref. cat.)	1.000	1.000	1.000	.
Age >=40 years	1.112	0.848	1.459	0.441
High school graduate or more	0.875	0.685	1.118	0.284
Personal annual income <5000	0.964	0.753	1.235	0.771
Biological sex	1.186	0.917	1.533	0.195
Baltimore	0.943	0.651	1.365	0.754
Miami	0.661	0.461	0.949	0.025
New York	0.776	0.537	1.123	0.179
San Francisco (ref. cat.)	1.000	1.000	1.000	.
Perceived health in the 6 months	0.920	0.828	1.021	0.117
Two or more HIV visits past 6 months	1.205	0.911	1.594	0.191
Currently taking HIV meds	0.753	0.601	0.943	0.014
No admission to a hospital for drug TX	1.085	0.809	1.455	0.587
Frequency of alcohol use in the past 3 months	0.825	0.614	1.107	0.200
Frequency of alcohol use in the past 3 months	0.813	0.625	1.057	0.122

Table 6. Longitudinal Analysis of Correlates of Self-Efficacy to Disclose Drug Use to a Provider (n=1923) Full Model

	Adjusted Odds Ratio (A.O.R.)	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)	Significance
Used non-injected drugs but not crack cocaine (past 3 months)	1.233	0.947	1.606	0.119
Used non-injected drugs and crack cocaine (past 3 months)	1.011	0.761	1.343	0.940
Not attending drug treatment	0.797	0.610	1.042	0.097
Patient provider relationship	1.595	1.324	1.922	<.0001
Taking control of healthcare	1.910	1.586	2.299	<.0001
Social Support	1.541	1.345	1.766	<.0001
Depression scale	0.996	0.881	1.125	0.943

Table 7. Longitudinal Analysis of Correlates of Self-Efficacy to Disclose Drug Use to a Provider (n=1960) Reduced Model

	95% Adjusted Odds Ratio (A.O.R.)	95% Confidence Interval (Lower Bound)	Confidence Interval (Upper Bound)	Significance
Intercept	0.012	0.004	0.037	<.0001
Condition	0.833	0.663	1.046	0.116
Assessment- Baseline	0.808	0.653	1.001	0.051
Assessment- 6 months	0.805	0.639	1.013	0.065
Assessment- 12 months	1.000	1.000	1.000	.
Non-Hispanic White	1.304	0.702	2.420	0.401
Non-Hispanic Black	1.012	0.617	1.659	0.963
Hispanic	0.772	0.440	1.356	0.368
Non-Hispanic other (ref. cat.)	1.000	1.000	1.000	.
Age >=40 years	1.103	0.845	1.440	0.471
High school graduate or more	0.896	0.704	1.140	0.371
Personal annual income <5000	0.960	0.754	1.222	0.737
Biological sex	1.182	0.923	1.515	0.185
Baltimore	1.035	0.727	1.474	0.848
Miami	0.666	0.468	0.947	0.024
New York	0.779	0.542	1.120	0.177
San Francisco (ref. cat.)	1.000	1.000	1.000	.
Currently taking HIV medications	0.751	0.601	0.938	0.012
Not attending drug treatment	0.757	0.603	0.952	0.017
Patient provider relationship	1.655	1.377	1.989	<.0001
Taking control of healthcare	1.926	1.605	2.310	<.0001
Social Support	1.579	1.386	1.798	<.0001

Table 8. Multivariate Logistic Analysis of Predictors of self- report of "no" to sharing lent a needed to or shared drug paraphernalia with HIV-negative/unknown serostatus (n=795)

	Odds Ratio (O.R.)	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)	Significance
Intercept	0.007	2.257	3.35+e15	0.228
Non-Hispanic White	1.456	0.816	2.597	0.203
Non-Hispanic Black	1.668	0.801	3.476	0.172
Hispanic	0.914	0.399	2.093	0.831
Age >=40 years	0.781	0.549	1.111	0.169
High school graduate or more	0.884	0.633	1.234	0.468
Biological sex	1.096	0.778	1.542	0.601
Miami	0.600	0.395	0.913	0.017
New York	0.188	0.106	0.333	<.0001
San Francisco	0.555	0.357	0.862	0.009
Self-efficacy to disclose drug use to HIV care provider	0.866	0.621	1.208	0.398

Table 9. Multivariate Logistic Analysis of Predictors of self- report of "no" to unprotected vaginal or anal intercourse (UVA) with HIV-negative/unknown serostatus partners in the past three months (n=791)

	Odds Ratio (O.R.)	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)	Significance
Intercept	0.007	2.257	3.35+e15	0.114
Non-Hispanic White	1.030	0.600	1.768	0.914
Non-Hispanic Black	0.711	0.348	1.456	0.351
Hispanic	1.194	0.567	2.511	0.641
Age >=40 years	0.622	0.435	0.888	0.009
High school graduate or more	0.763	0.540	1.079	0.126
Biological sex	0.728	0.515	1.029	0.072
Miami	1.789	1.131	2.829	0.013
New York	0.764	0.435	1.341	0.349
San Francisco	2.015	1.260	3.223	0.003
Self-efficacy to disclose drug use to HIV care provider	0.767	0.546	1.079	0.128

Table 10. Multivariate Logistic Analysis of Predictors of self- report of "yes" to utilizing HIV care two or more times in the past six months (n=806)

	Odds Ratio (O.R.)	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)	Significance
Intercept	0.007	2.257	3.35+e15	<.0001
Non-Hispanic White	0.670	0.349	1.285	0.228
Non-Hispanic Black	0.691	0.308	1.548	0.369
Hispanic	0.722	0.296	1.763	0.475
Age >=40 years	1.114	0.760	1.634	0.579
High school graduate or more	1.162	0.811	1.664	0.414
Biological sex	0.868	0.598	1.260	0.455
Miami	0.373	0.238	0.586	<.0001
New York	1.800	0.977	3.318	0.059
San Francisco	1.064	0.633	1.788	0.816
Currently taking HIV medications	0.986	0.688	1.413	0.938