Fall 1-9-2015

Health care access, utilization and barriers among injection drug users

Ishaka Oche

Health care access, utilization and barriers among injection drug users

By

Ishaka Oche, MSCR

A Thesis Submitted to
The Graduate Faculty of Georgia State University
In Partial Fulfillment of the Requirements for the Degree

MASTER OF PUBLIC HEALTH

Under the Direction of
Natalie Crawford, PhD, and Richard Rothenberg, MD MPH

ATLANTA, GEORGIA
30303

Health care access, utilization and barriers among injection drug users

By
Ishaka Oche

Approved by:

Natalie Crawford, PhD
Committee Chair

Richard Rothenberg, MD MPH
Committee Member

December 8, 2014

ACKNOWLEDGEMENTS

First, I would like to give thanks to Our God Almighty for giving me the opportunity and strength thus far. To my parents and siblings for encouraging me, always ready to listen, support and pray with me throughout this process, I cannot say thank enough.

I am also very thankful for and grateful to all of the faculty and staff at the School of Public Health at Georgia State University, and my colleagues throughout my study. I remain indebted to Dr. Natalie Crawford, my committee chair who painstakingly guided me from the beginning of my program and through working on this project, to Dr. Richard Rothenberg for reading and editing my manuscript to make it better, and also to Dr. Dora Il'yasova my academic adviser as well as to Dr. Ike Okosun, Director Division of Biostatistics and Epidemiology, thank you to all. Many thanks also goes to the PHARM-Link study team, Dr. Crystal Fuller and Alexis Rivera, MPH for allowing me use their data and to the study participants without whom I would have no data.

Finally, to my husband James, my backbone through life and kids Ehinehi and Adam, I am so grateful for your sacrifices of our time together on countless occasions while I studied and worked for hours on analyzing data and writing. You all mean the world to me and make me whole, thank you immensely.

TABLE OF CONTENTS

ABSTRACT……..5

INTRODUCTION……6

Background……6

Study objectives……7

REVIEW OF LITERATURE……..7

Epidemiology of Substance Abuse among IDUs……7

Risk factors related to substance use……9

Importance of consistent medical care……..10

Epidemiology of medical care for IDUs……..10

Related problems for IDUs……10

METHODS……14

Study Population……14

Data Collection……14

Dependent variables……15

Independent variables……16

Statistical methods……17

RESULTS……17

Sample Description……17

Bivariate analysis……..20

Multivariate analysis……..22

DISCUSSION……23

Access to Same provider and usual source……24

Service utilization……..25

Barriers to health access……26

CONCLUSION……..28

REFERENCES……29

ABSTRACT

Background: To curb the transmission of HIV/AIDS and other infectious diseases several studies indicate the need for improved access to medical care for injection drug users (IDUs) including those already linked to syringe exchange programs (SEPs). However, availability and access to services remains a problem for many IDUs. This study seeks to examine perceptions of medical care access among a pharmacy-based sample of IDUs, utilization of medical services among IDUs and, identify barriers to accessing health care services to help ensure that IDUs receive appropriate care when needed and reduce the transmission of diseases.

Methods: Data was obtained from the Pharmacists As Resources Making Links to Community Services (PHARM-Link) study. Dependent variables: health care access to the same provider and receiving care a usual source, health care utilization of services including the emergency room, clinic, medical office, medical mobile unit and hospital; and health care barriers categorized as personal or structural. Independent variables were insurance status, homelessness in the prior six months, case management, drug treatment and socio-demographic characteristics such as age, sex, income, education and employment status. Descriptive statistics analysis and logistic regression were performed using SAS version 9.4 (2013) with significance set at $p<0.05$.

Results: Our sample included 615 IDUs participating in the PHARM-Link study. Overall, IDUs accessed health services and having the same provider remained statistically higher among those with legal income above $5,000 OR: 1.60 (95% CI: 1.03- 2.48), the insured OR: 4.11 (95% CI: 2.48-6.79), and those with positive HIV status OR: 7.64 (95% CI: 3.18 – 18.36), while those who were homeless reported lower access to the same provider OR: 0.63 (95% CI: 0.43 – 0.92). Only the older age group OR: 2.85 (95% CI: 1.42-5.73) and the insured OR: 3.42 (95% CI: 1.81-6.46) remained significantly associated with more access to receiving health needs at the same location. Those with some college education had less frequent visits to the clinic OR: 0.59 (95% CI: 0.38-0.92) and medical office OR: 0.64 (95% CI: 0.41-0.99), while the homeless were more likely to visit the emergency room OR: 1.49 (95% CI: 1.06-2.11). Females were less likely to go to a mobile unit OR; 0.52 (95% CI: 0.33-0.83) and married people were more likely OR: 1.95 (95% CI: 0.28-0.91). Visit to the hospital were less likely among females OR: 0.54 (95% CI: 0.36-0.81) and among those with some college education OR: 0.63 (95% CI: 0.41-0.96). Those with legal income above $5,000 were less likely to have any personal barriers OR: 0.64 (95% CI: 0.45 – 0.92). Structural barriers remained more likely among those who were homeless OR: 1.62 (95% CI: 1.13-2.39), but less likely among those 44 years and older OR: 0.58 (95% CI: 0.40-0.85), the insured OR: 0.60 (95% CI: 0.38-0.94), those with positive HIV status OR: 0.53 (95% CI: 0.28-0.99), as well as Non-Hispanic Blacks OR: 0.47 (95% CI: 0.14-0.83) and Latinos OR: 0.47 (95% CI: 0.25-0.86).

Conclusion: Our results suggest that most IDUs linked to care through pharmacy-based SEP programs established to expand health services and improve health, did access available health services. However, some continue to experience difficulties such as structural barriers among the homeless as well as few reported visits to the clinic, medical office and the hospital among the employed believed to have resources to pay for such services. These services may have been underutilized because the participants were unsatisfied with the services provided. Therefore, interventions should target structural barriers such as homelessness among IDUs as well as health insurance coverage to help increase access to and utilization of health services.

CHAPTER 1

INTRODUCTION

Substance use and abuse is a major problem and public health concern. An estimated 23.9 million people in the United States aged 12 years and above are current illicit drug users, about 3 million of whom are people who inject drugs (PWID) (National Survey on Drug Use and Health, NSDUH, 2012). Substance use and abuse are critical risk factors for transmission of HIV and other blood borne infections including Hepatitis C virus (HCV) and Hepatitis B virus (HBV) (Center for Disease Control and Prevention, CDC). Substance use, specifically injection drug use accounts for about 3 million HIV infections worldwide (Vlahov et al., 2010).

In order to curb the transmission of HIV, several studies indicate the need for improved access to medical care for injection drug users (IDUs) including those already linked to syringe exchange programs (SEPs) (Cisneros et al, 2009; Burr et al, 2014; Fuller et al, 2007; Heinzerling et al, 2006), and the establishment of structural interventions beyond SEPs (Crawford et al., 2013; Small et al., 2008). Preexposure antiretroviral prophylaxis among IDUs has been proven to reduce the incidence of HIV (Choopanya et al., 2013). Additionally, community outreach programs and SEPs have effectively reduced infection rates among IDUs, provided preventive services such as vaccinations and health screenings for tuberculosis and other sexually transmitted infections (STIs) (Riley, et al., 2006).

Study objectives

Availability and access to services remains a problem for many injection drug users. This study therefore, seeks to examine perceptions of medical care access among a pharmacy-based sample of IDUs and to characterize the factors that affect access to, and utilization of medical services. Also, we identify barriers IDUs face when accessing health care services to help ensure that IDUs receive appropriate care when needed, reduce the transmission of HIV, HCV & HBV, as well as other sexually transmitted infections (STIs) such as gonorrhea, chlamydia and syphilis.

CHAPTER 2

REVIEW OF LITERATURE

Epidemiology of Substance Abuse among IDUs

In 2012, 9.2% of the population aged 12 and above reported using illicit drugs with 7.3% using marijuana, or other illicit drugs including cocaine, ecstasy and methamphetamine (CDC, 2013). Initiation of injection drug use varies across different populations. For men and women, initiation of drug use results from curiosity, pressure from social network members and sexual partners, particularly among rural women. (Young et al., 2014). Because drug procurement is easier for males in nature, initiation between intimate partners is common, further increasing disease transmission (Simmons et al., 2012.). HIV transmission among men who have sex with men and inject drugs (MSM/IDUs) account for 4% - 12% of all MSM and 11% - 39% of all male IDUs (Morbidity and Mortality Weekly Report CDC, 2013). Substance use and abuse are

critical health risk factors for transmission of diseases and infections among youths, adolescents and adults in the United States (CDC, 2013).

In an attempt to reduce the spread of disease and infection, several states enacted syringe exchange programs (SEP) to increase access for IDUs who continue to inject (CDC, 2002). These programs also provide minor health services, treatment referrals, counseling and education to their clients. Yet, many IDUs experience obstacles while seeking care. In the United States, only 64% of all SEPs were found to provide onsite testing and counseling for HIV; only 24% of SEPs provided HCV testing, while 16% and 13% of SEPs provided HBV vaccinations and STI testing respectively (Heinzerling et al., 2006).

In Philadelphia, health access barriers were found to persist among IDUs participating in a needle exchange program (Cisneros et al., 2008). Some of these barriers include feelings of anxiety and distrust of the system, lacking health insurance coverage and transportation problems. Given the limited access in terms of hours and locations of SEPs, New York State also established the Expanded Syringe Access Program (ESAP) allowing pharmacies to sell syringes without a prescription in order to reduce HIV transmission among IDUs. ESAPs has been shown to promote safe syringe disposal and reduce HIV transmission rate particularly among IDUs (Cisneros et al., 2009; Crawford et al., 2013). It has also been shown to reduce negative attitudes towards IDUs, a highly stigmatized population by the pharmacy staff who sell syringes to IDUs (Crawford et al., 2014) and community members where substance use is prevalent (Fuller at al., 2007).

Risk factors related to substance use

IDUs are at risk for a host of health problems, diseases and infections and drug overdose (Young et al., 2014). Hepatitis C Virus (HCV), Hepatitis B Virus (HBV) and other transmissible infections co-occurring with HIV can increase the severity of disease and is highly communicable among IDUs (Cisneros et al., 2009: Kapaida et al, 2007; Lundgren et al, 2004). IDUs are also at an increased risk for depressive symptoms (Knowlton et al, 2001; Sapra et al, 2013) and mental health problems (Amodeo et al, 2004; Sapra et al, 2013). IDUs face social and structural barriers to accessing and receiving much needed care. Krusi et al (2010) acknowledge the influence of factors - social and structural that impede health access for IDUs. Lifestyle choices of drug users (Bell et al., 2005) centers around obtaining and using drugs, frustrating employment efforts or failing to remain employed which may lead to unemployment, unstable income and the absence of health insurance. Being uninsured is a major predictor of poor health care access (Knowlton et al 2001; Riley et al, 2002) among IDUs linked into SEPs (Cisneros et al, 2009). Many IDUs simply refuse to access care, are unmotivated to seek treatment for personal reasons or believe in self-management leading to poor outcomes (Mowbray et al, 2010).

Although regular use of SEPs is associated with a lower risk of HIV injection practices among IDUs (Ouellet et al., 2004), being able to access health services and receiving care when needed is important. IDUs not linked to care through SEPs or HIV treatment usually rely on the emergency room which can be expensive and generally not set up to provide consistent ongoing preventive services. The goal of this study is to

explore socio-demographic characteristics including homelessness, (Linton et al., 2013) sexual orientation, particularly among male IDUs (Reilly et al., 2014), employment status and income that contribute to health risk factors and may act as access barriers to health services among IDUs.

Importance of consistent medical care

Consistent medical care access is important for substance users because regular access to care drastically reduce rates of HIV transmission through early detection and treatment (Wood et al., 2008). Integration of substance abuse treatment, case management and medical services delivery contributes to improved HIV care for IDUs infected with HIV/AIDS and improves drug treatment enrollment and completion (Knowlton et al., 2001).

Increased access to primary care, (Chitwood et al., 2002) health counseling, treatment referral and health services (Rivera et al, 2003) such as SEPs and non-prescription syringe sales in pharmacies for injection drug users (IDUs) has notably reduced the rate of infectious disease transmission among IDUs (Crawford et al., 2013; Sohler et al, 2007; Heinzerling et al., 2006; Rudolph et al, 2010).

Epidemiology of medical care for IDUs

Research into health care access problems among substance abuse users has largely focused on available populations with HIV/AIDS receiving highly active-antiretroviral therapy, (HAART) (Knowlton et al., 2001; Mizuno et al., 2006: Kang et al.,

2006; Sohler et al., 2007) IDUs with Hepatitis C, (Kapadia et al., 2007) both (Braitstein et al., 2007) or emergency room (ER) use, (Lundgren et al., 2005; Small et al., 2008) as well as comparisons between insured and uninsured IDUs (Bell et al., 2005).

While some IDUs receive care at treatment facilities, others repeatedly delay seeking care for various reasons (McCoy et al., 2001). Prevalent reasons include treatment refusal, self- treatment and delaying treatment because they lack insurance and/or the high costs of care. Even among IDUs already receiving HAART, access problems persist across gender and ethnic minorities (Wood et al., 2008).

Wood and colleagues attempt to explain that the factors for poor access to HAART can be assembled into socio-structural factors, individual-level factors and provider-based concerns. A combination of these factors at different levels leads to poor health outcomes. Increasing access to pharmacists other well-trained health care staff may reduce access problems.

Related problems for IDUs

IDUs attempting to access medical care and other health services may face challenges since many lack health insurance, have insufficient disposable income to cover costs, reside in low medical coverage areas, (Crandall et al., 2003) and may have scarce interaction or communication with health care providers (Mizuno et al., 2006). Inadequate or poor access to treatment and other health services among IDUs may also be a direct result of lack of information – where to go to obtain service and what services are available, the stigma of substance use – which can either be internalized or

enacted (Semple et al., 2012) for example in rural populations with no syringe exchange laws (Young et al., 2014) and inadequate training of health care staff in dealing with this population (Wood et al., 2008; Lutnick et al., 2012).

Access to primary care services among injection drug users linked to care is improved by professionally trained workforce including pharmacists, nurses as well as other staff focused on addressing social and structural barriers that impedes access (Small et al., 2008). Because drug use is associated with low or suboptimal outpatient service use, SEPs, supervised injecting facilities (SIFs) and the emergency room are the main source for IDUs to receive treatment. In the course of treatment at these facilities, drug users also receive additional services that may contribute to harm reduction (Rudolph et al., 2010) including health education, onsite medical services, counseling, referral to drug abuse treatment as well as other social services.

Linking IDUs to medical and social services is enhanced by structural interventions like deregulation of syringe sales because pharmacists and pharmacy staff become familiar with those who purchase syringes and can offer professional health advise. Advise that contributes to addressing the unmet need for medical services among drug users (Bell et al., 2005). Injection drug users are at a great risk for infection particularly when primary heath needs are unmet. Riley et al (2002) found that the utilization of health services is much lower among uninsured IDUs compared to insured IDUs participating in a needle exchange program (NEP). Also, IDUs that regularly access NEPs exhibit less risky HIV injection practices (Ouellet et al., 2004).

An ideal approach for preventing diseases transmission among IDUs are structural or multilevel interventions such as including information on HIV risk reduction and other services in pharmacy practice during syringe sales. (Crawford et al., 2014) In disadvantaged neighborhoods, pharmacy staff frequently provides non-prescription counseling to their customers (Rivera, et al., 2010) and are ideally positioned in the community. Pharmacist and pharmacy staff attitudes would require increased awareness to the needs of IDUs (Lutnick et al., 2012) and are responsive to receiving professional development and open to providing IDUs with relevant medical services (Rivera et al., 2010).

Syringe access programs allow for integration of services to prevent and treat diseases as well as promote health among an underserved population of IDUs (Burr et al., 2014). It is important for pharmacists and pharmacy staff to receive adequate training in dealing with injection drug customers because they are key to identifying barriers and improving access to health services among IDUs (Van Boekel et al., 2013). Sufficiently identifying the barriers to health care access among IDUs irrespective of HIV status or other disease conditions would ensure that care is received when needed. IDUs may also actively seek care if they trust the system to adequately address their health problems and concerns.

CHAPTER 3

METHODS

Study Population

This study used data from the Pharmacists As Resources Making Links to Community Services (PHARM-Link) study. PHARM-Link is a community-based, randomized pharmacy-intervention among ESAP-registered pharmacies in Harlem, Lower Manhattan, the Bronx, Brooklyn, and Queens that expanded social services to IDUs, beyond the sale of non-prescription syringes, to include information on safe injection, syringe disposal, and overall health concerns. (Crawford et al, 2011). A detailed description of the intervention methods are described elsewhere. But in brief, eligible pharmacies had at least (1) one new non-prescription syringe customer in an average month, (2) one new customer that became a regular customer in an average month, (3) no additional documentation from customers during syringe transactions could be solicited, and (4) the pharmacy staff had to be willing to sell syringes to IDUs. Pharmacy staff were trained to engage and recruit IDU syringe customers who repeatedly purchased syringes into the study.

Data Collection

Six hundred and fifteen IDU customers who were interested in participating in the study were offered an appointment to complete a survey administered by the research staff. Following review and consent of all study procedures, participants completed a baseline survey in a private area of the pharmacy using Audio Computer

Assisted Self-Interviewing (ACASI). Participants were also given an appointment to return in 3 months to complete a follow-up survey and were compensated for their participation. Questionnaires assessed basic demographics, drug treatment, social relationships, health insurance status, current alcohol and drug use, HIV status, emergency room (ER) and non-ER service use and health care barriers. The Institutional Review Boards at the New York Academy of Medicine and Columbia University Medical Center approved this study.

Dependent variable

The dependent variables included several measures that capture usual source for health care access, health care utilization and health care barriers. Measures of usual source for health care access include: 1) Reports of seeing the same provider 90 percent of the time assessed by the question 'When you go there do you usually (more than 90% of the time) see the same doctor, nurse, or physicians assistant?' and 2) Having a usual source for health needs assessed by 'Where do you usually go to see a doctor, nurse, or physicians assistant for medical care?. Response options for usual type of facility were community clinic, private medical office, mobile medical unit, emergency room and hospital for non-emergency inpatient care.

Health care utilization measures were created as at least one visit to any of the following within the previous six-months 1) emergency room, 2) clinic, 3) medical office, 4) mobile medical unit, and 5) hospital.

Health care barriers were divided into personal and structural barriers. Participants were asked, “During the past year, did any of the following keep you from going to a healthcare provider?” Structural barriers included; didn’t have money or insurance to pay; unable to get transportation; inconvenient location, hours, time etc.; didn’t know where to go; and on the street. Personal barriers included forgot to go; missed appointment(s); too busy to go; feel good, didn’t need to go to a health provider; moved or out of town; and drinking or using drugs. Structural and personal barriers were dichotomized as any (one or more barriers) versus none.

Independent variables

The independent variables assessed include: current health insurance status (yes/no), homelessness in the six months prior to completing the survey (yes/no), self-reported HIV status (yes/no), past six month drug treatment (yes/no) and case management (yes/no). Drug treatment was assessed as being in any treatment (methadone treatment, detox, residential therapeutic community, narcotics anonymous or drug counseling) in the previous six months. Case management was assessed as the use of a case manager, social worker or counselor to help access any service. Socio-demographic and behavioral characteristics assessed as potential confounders include age (dichotomized above and below the median of 44 years), race (White, Black, Latino), sex (male, female), employment (yes/no), legal income (dichotomized above and below $5,000) and highest level of education (dichotomized as high school or GED and some college or higher).

Statistical methods

Descriptive characteristics including frequencies and percentages for all independent and dependent variables were calculated for the study sample. We performed adjusted and unadjusted logistic regression to determine the relationship between each dependent variable and the independent variables to obtain odds ratios and 95% confidence intervals. Variables significant in the bivariate analysis at $p<0.05$ were included in the adjusted analysis. All statistical analysis was performed using SAS version 9.4 (2013).

CHAPTER 4

RESULTS

Sample Description

Descriptive characteristics of the sample are shown in Table 1. A total of six hundred and fifteen injection drug users were included in this analysis with a mean age of 44 years. Half of the participants were Latino; about a quarter were non-Hispanic Black (26.7%) and 13% were non-Hispanic White. The majority of the sample was male (71.7%) and single (77.7%). About 71% reported legal income below five thousand dollars and an education level of high school or less (76%). A majority (82%) had some form of medical insurance coverage. In the six months prior to the date of interview, less than half reported being homeless (35%) and most were unemployed (86%). HIV prevalence was high (13.3%). Almost every one attended some kind of drug treatment

program within the past six months (97%), but less than half had ever been to a case manager (43%).

With respect to the outcomes of interest, 61% reported seeing the same provider and the majority of the sample used the same location for health needs (91%). In the six months before the interview, most participants had visited the emergency room (55%), a clinic (80%), medical office (79%), a mobile medical unit (82%) or the hospital (75%). Many participants also experienced personal barriers (61%) and structural barriers (32%) that prevented them from seeking health care.

Table 2 shows the prevalence of each dependent variable by the sample characteristics. Individuals younger than 44 years were less likely to report access to the same provider ($p = 0.003$) compared to those 44 years old and over. Males compared to females ($p = 0.023$), those with legal income below $5,000 compared to those with income above $5,000 ($p = 0.014$), uninsured compared to the insured ($p<.0001$), unemployed compared to the employed ($p = 0.014$) and HIV negative compared to HIV positive participants ($p<.0001$) were also less likely to have the same provider.. Those who had seen a case manager compared to those who had not ($p = 0.023$) were more likely to have the same provider. Receiving health related care at a usual source was significantly lower among those younger than 44 years old compared to those who were older ($p = <0.001$), the uninsured compared to the insured ($p = <.0001$), those with legal income less than $5,000 compared to those with income above $5,000 ($p = 0.021$) and those reporting any type of drug treatment compared to those with no drug treatment

(p = 0.034) and those who reported seeing a case management compared to those who reported not seeing a case manager (0.021).

Previous 6-month emergency room visits for those 44 years and above was significantly lower compared to those younger than 44 years (p=0.036), also those who were not homeless had fewer visits to the ER compared to those who reported being homeless in the previous six months (p=0.011). Participants with some college education or higher had fewer clinic visits compared to those with a high school education or GED (p = 0.015), as well as the uninsured compared to the insured (p=0.046) and those who reported being homeless compared to those who were not homeless (0.044). Medical office visits was statistically lower among the college educated compared to those with a high school education or GED (p = 0.048). Males (p=0.022) reported having frequent visits to a mobile unit compared to females and other groups with significantly higher percentages included married individuals compared to those who were single (p=0.047) and those who had seen a case manager compared to those who had not seen a case manager (p=0.019). Those with legal income less than $5,000 compared to those with income above $5,000 (p=0.036), those who completed high school or GED education compared to those with a college education (p=0.019) and males compared to females (p=0.004) were more likely to have visited the hospital in the previous six months.

Personal barriers were statistically higher among those 44 years and older compared to those younger than 44 years old (p=0.037), those with a legal income less than $5,000 compared to those with legal income above $5,000 (p=0.007) and those

who reported seeing a case manager compared to those who reported not seeing a case manager (p=0.021). Lastly, structural barriers were higher among the younger age group (less than 44 years) compared to those 44 years old and above, Non-Hispanic whites (p=0.001) compared with other race/ethnicities, the uninsured compared to the insured (p=0.002), homeless individuals compared to those who reported not being homeless (p=0.000) and those with negative HIV status compared to those who were HIV positive. Reports of seeing a case manager had a lower percentage of structural barriers (p=0.000) compared to those who reported not seeing one.

Bivariate analysis

In the bivariate analysis of the independent variables shown in Table 3, older age OR: 1.65 (95% confidence interval: 1.18-2.30), being male OR:115 (95% confidence interval: 1.06-2.26), having legal income above $5,000 OR:1.55 (95% confidence interval: 1.06-2.25), having health insurance OR:4.57 (95% confidence interval: 2.89-7.22), positive HIV status OR: 10.05 (95% confidence interval: 4.29-23.53) and case management OR: 1.85 (95% confidence interval: 1.08-3.15) were also associated with having the same health care provider. Homelessness within the previous six months OR: 0.48 (95% confidence interval: 0.34-0.68) and being employed OR: 0.54 (confidence interval 0.33-0.86) were protective against seeing the same provider for health related needs. The groups significantly associated with the a usual source were older age OR: 3.45 (95% confidence interval: 1.76-6.76) the insured OR: 4.07 (95% confidence interval: 2.21-7.50), those with legal income above $5,000 OR: 2.62 (95% confidence interval:

1.15-5.95), those who had received drug treatment OR: 3.26(95% confidence interval: 1.09-10.97), and case management OR: 2.40 (95% confidence interval: 1.13-5.08).

Visits to the ER were significantly associated with older age OR:0.71 (95% confidence interval: 0.51-0.97) and homelessness OR: 1.56 (95% confidence interval: 1.11-2.19). Those who were uninsured OR: 1.63 (95% confidence interval: 1.00-2.63) were statistically associated with more frequent visits to the clinic in the prior six months, while the homeless OR: 0.65 (95% confidence interval: 0.43-0.98), and a college education OR: 0.58 (95% confidence interval: 0.37-0.90) were significantly associated with less visits to the clinic. College educated participants were significantly less likely to visit a medical office OR: 0.64 (95% confidence interval: 0.41-0.92) within the previous 6 months. The female gender was found to be significantly associated with fewer visits to a medical mobile unit OR: 0.59 (95% confidence interval: 0.38-0.92) and hospital OR:0.56 (95% confidence interval: 0.38-0.84). Other significant associations to more frequent visits to a mobile unit were among those married OR: 1.77 (95% confidence interval: 1.00-3.14) and those who had seen a case manager OR: 3.44 (95% confidence interval: 1.22-9.70), while those with legal incomes above $5,000 OR: 0.65 (95% confidence interval: 0.44-0.97) and a college education or above OR: 0.61 (95% confidence interval: 0.40-0.92) were significantly associated with fewer visits to the hospital.

Personal barriers were significantly associated with being older OR: 1.14 (95% confidence interval: 1.02-1.96), having legal income above $5,000 OR: 0.61 (95% confidence interval: 0.43-0.88) and case management OR: 1.84 (95% confidence

interval: 1.09-3.09). Significant associations were also found between structural barriers and older age OR: 0.48 (95% confidence interval: 0.34-0.68), being insured OR: 0.61 (95% confidence interval: 0.33-0.78), positive HIV status OR: 0.40 (95% confidence interval: 0.21-0.73), being homeless OR: 1.93 (95% confidence interval: 1.35-2.72) and race, with Blacks OR: 0.41 (95% confidence interval: 0.28-0.77) and Latinos OR: 0.34 (95% confidence interval: 0.19-0.61) less likely to have structural barriers compared to Whites.

Multivariate analysis

In the multivariate logistic regression model shown in Table 4, only the variables significantly associated with the dependent variables were included in the analysis. Having the same provider remained statistically higher among those with higher legal income OR: 1.60 (95% confidence interval: 1.03- 2.48), the insured OR: 4.11 (95% confidence interval: 2.48-6.79), and those with positive HIV status OR: 7.64 (95% confidence interval: 3.18 – 18.36) while those who were homeless reported lower access to the same provider OR: 0.63 (95% confidence interval: 0.43 – 0.92).

Only the older age group OR: 2.85 (95% confidence interval: 1.42-5.73) and the insured OR: 3.42 (95% confidence interval: 1.81-6.46) remained significantly associated with more access to receiving health needs at a usual source. Those with some college education were still found to have less frequent visits to the clinic OR: 0.59 (95% confidence interval: 0.38-0.92) and medical office OR: 0.64 (95% confidence interval: 0.41-0.99), while the homeless were more likely to visit the emergency room OR: 1.49

(95% confidence interval: 1.06-2.11). Females were less likely to go to a mobile unit OR; 0.52 (95% confidence interval: 0.33-0.83) and married people were more likely OR: 1.95 (95% confidence interval: 0.28-0.91). Visit to the hospital were less likely among females OR: 0.54 (95% confidence interval: 0.36-0.81) and among those with some college education OR: 0.63 (95% confidence interval: 0.41-0.96).

Those with legal income above $5,000 were less likely to have any personal barriers OR: 0.64 (95% confidence interval:. 0.45 – 0.92). Structural barriers remained more likely among those who were homeless OR:1.62 (95% confidence interval: 1.13-2.39), but less likely among those 44 years and older OR: 0.58 (95% confidence interval: 0.40-0.85), the insured OR: 0.60 (95% confidence interval: 0.38-0.94), those with positive HIV status OR: 0.53 (95% confidence interval: 0.28-0.99), as well as Non-Hispanic Blacks OR: 0.47 (95% confidence interval: 0.14-0.83) and Latinos OR:0.47 (95% confidence interval: 0.25-0.86).

CHAPTER 5

DISCUSSION

This study provides an opportunity to explore health care access, utilization and barriers among injection drug users (IDUs) participating in a pharmacy-based syringe exchange program. We found that IDUs continued to experience problems with access to health care, utilization of medical services and structural barriers. Previous studies among IDUs have focused on health access problems among IDUs with HIV/AIDS

receiving treatment (Knowlton et al., 2001; Wood et al., 2008; Mizuno et al., 2010; Kang et al., 2006), other drug treatment programs (Braitstein et al., 2006) or medically supervised injecting facilities (Small et al., 2008). These studies show integrating social services and syringe/needle exchange programs have been found to increase utilization of health services among IDUs (Riley et al., 2002; Mizuno et al., 2006).

Access to Same provider and usual source

Our results were consistent with findings from the Knowlton paper with females more likely to report seeing the same provider for their health needs, as well as those with insurance and case management. Other groups in our study that also reported seeing the same provider included those over 44, the insured and those who were HIV positive, while those who were homeless in the prior 6 months and were employed were less likely to report seeing the same provider compared to those who were not homeless and the unemployed, respectively. Homelessness has been found to be negatively associated with health access and medication adherence (Palepu et al., 2011; Linton et al., 2013; Milloy et al., 2012). It is unclear why the employed were less likely to report seeing the same provider compared to the unemployed since the employed are more likely to have resources for health provider visits.

Having a usual source for health needs was similar to the HIV-based sample in the Knowlton paper where it was more likely among those who were insured and those who reported seeing a case manager for assistance or being in any drug treatment. Also those with legal income above $5,000 were twice as likely to go to the same location

compared to those earning less than $5,000. In general, as seen in other injection drug users (IDUs) studies (Chitwood et al., 2001; Knowlton et al., 2001; Cisneros et al., 2009; Riley et al., 2002; Cronquist et al., 2001) having health insurance is important to increasing access to health care services to the same location and or same provider. Our data indicate that IDUs who are uninsured continue to experience problems with a continuity of health care. Seeing the same provider and having a usual source for services is important because the providers can develop a relationship with their clients in an attempt to better understand, treat and counsel patients while providing care. Thus, interventions aimed at improving and maintaining a continuity of care among this population are still needed.

Service Utilization

Previous studies have shown that service utilization among IDUs is problematic, even among those participating in syringe exchange programs (Cisneros et al., 2009). Our study found significant utilization of the emergency room, clinic, medical office, medical mobile units and the hospital. Socio-demographic characteristics related to service utilization included being female, homeless, college educated and married. All participants used at least one health service location in the 6 months prior to the completing the survey. However, there were differences seen in the type of service utilized. Similar to a US-based IDU study, we found that females were less likely than males to report visits to a medical mobile unit and to the hospital (Solomon et al. 1991). However, these findings are contrary to the results of a Canadian-based IDUs study

(Palepu et al., 1999) where females were more likely to use the hospital. Additionally, IDUs with some college education were less likely to have visited the clinic, medical office or hospital in the prior six months compared to those with a high school education or less. To our knowledge, no studies have shown significant associations between college education and health service facilities. We also found that married participants were almost twice as likely to have been to a mobile medical unit in the previous six months compared to those who were single.

Barriers to Health Access

Injection drug users have been shown to delay seeking care for different reasons including "not wanting treatment" and "self-treatment" (McCoy et al., 2001). Findings from our study indicate that IDUs with legal income greater than $5,000 were less likely to report having any personal barriers; this remained significant at the multivariate level. The personal barriers in this study included "forgot to go;" missed appointment(s); too busy to go; feel good, didn't need to go to a health provider; moved or out of town; drinking or using drugs, which were different from the reasons like self treatment or total refusal to seek treatment in the McCoy study (McCoy et al., 2001). Similar to findings in Milloy et al (2012), our study found that homelessness was a significant structural barrier to seeking or obtaining care among drug users. In our analysis, IDUs who were homeless in the previous six months were more likely to report structural barriers such as didn't have money or insurance to pay; unable to get transportation; inconvenient location, hours, time etc.; didn't know where to go; and living on the street

which impedes many health interventions.. We also found that those who were insured and had HIV were less likely to report structural barriers compared to the uninsured and HIV negative. This is likely due to the ease with which they access HIV treatment facilities through alcohol and drug education programs (ADEP). However, structural barriers can be effectively addressed and reduced by interventions particularly targeting injection drug users that experience barriers like homelessness as well as providing coverage for IDUs who are uninsured.

There are a few limitations to our study. First, this study used secondary data and therefore reporting errors and bias can arise from using this type of data. Also, we are unable to draw conclusions on cause and effect among the significant associations, such as if IDUs who were homeless experienced structural barriers as a result of it or having barriers led to their being homeless. Although these data were initially collected for a different purpose, we were able to use the data to answer an ancillary research question, which was to identify factors that affect health access among IDUs. Additionally, we were able to include homelessness and employment status as independent variables that affect health care access, which some other IDU studies were unable to include (Cisneros et al., 2009; Mizuno et al., 2006; Palepu et al., 1999). Our measures of access to care, service utilization and barriers was limited to individual reports by the study participants. We were unable to confirm reports of actual visits to the clinic, emergency room, hospital or other medical facilities in the previous 6 months.

CHAPTER 6

CONCLUSION

Our results suggest that most IDUs linked to care through pharmacy-based programs established to expand services and increase health accessed health services at significantly high rates. However, some continue to experience difficulties such as structural barriers among the homeless and few reported visits to the clinic, medical office and hospital among the employed who may have resources to pay for such services. These services may have been underutilized because the participants were unsatisfied with the services provided at these locations. Also, health concerns among IDUs may be secondary to satisfying their drug needs (Chitwood et al., 2002).

Our study was a cross-sectional analysis of the PHARM-Link cohort at baseline, analysis of the same cohort over time may indicate if our findings are a result of self-reported experiences before ESAP programs were fully established by the pharmacies or if the same problems persist even with the increased roles of pharmacists and pharmacy staff toward IDUs. Access to pharmacist and pharmacy staff trained to effectively assist IDUs with health care needs would provide IDUs with more options to address their health care needs, thereby reducing reliance on other locations including the emergency room, clinics and hospitals.

REFERENCES

1. Amodeo, M., Chassler, D., Ferguson, F., Fitzgerald, T., & Lundgren, L. (2004). Use of Mental Health and Substance Abuse Treatment Services by Female Injection Drug Users. *The American Journal of Drug and Alcohol Abuse*, *30*(1), 101–120. doi:10.1081/ADA-120029868
2. Andrasik, M. P., & Network, F. H. V. T. (n.d.). THE INTERSECTION OF SOCIAL/STRUCTURAL FACTORS ON HIV AMONG WOMEN. Retrieved from http://depts.washington.edu/nwaetc/PDF%20PRESENTATIONS/6%20Andrasik%20Social%20Structural%20Factors.pdf
3. Bell, D., Mosier, V., Patek, J., & Dayton-Shotts, C. (2005). Health Care Among Insured Drug Users and Nonusers. *Substance Use & Misuse*, *40*(6), 743–760.
4. Blaney, S. (2010). Individual- and neighborhood-level factors associated with nonprescription counseling in pharmacies participating in the New York State Expanded Syringe Access Program. *Journal of the American Pharmacists Association*, *50*(5), 580. doi:10.1331/JAPhA.2010.09202
5. Braitstein, P., Li, K., Kerr, T., Montaner, J. S. G., Hogg, R. S., & Wood, E. (2006). Differences in access to care among injection drug users infected either with HIV and hepatitis C or hepatitis C alone. *AIDS Care*, *18*(7), 690–693. doi:10.1080/09540120500359330
6. Burr, C. K., Storm, D. S., Hoyt, M. J., Dutton, L., Berezny, L., Allread, V., & Paul, S. (2014). Integrating health and prevention services in syringe access programs: a strategy to address unmet needs in a high-risk population. *Public Health Reports (Washington, D.C.: 1974)*, *129 Suppl 1*, 26–32.
7. Chatterjee, S., Tempalski, B., Pouget, E. R., Cooper, H. L. F., Cleland, C. M., & Friedman, S. R. (2011). Changes in the Prevalence of Injection Drug Use Among Adolescents and Young Adults in Large U.S. Metropolitan Areas. *AIDS and Behavior*, *15*(7), 1570–1578. doi:10.1007/s10461-011-9992-0
8. Chitwood, D. D., Comerford, M., & McCoy, H. V. (2002). Satisfaction with access to health care among injection drug users, other drug users, and nonusers. *The Journal Of Behavioral Health Services & Research*, *29*(2), 189–197.
9. Chitwood, D., Sanchez, J., Comerford, M., & McCoy, C. (2001). Primary Preventive Health Care Among Injection Drug Users, Other Sustained Drug Users, and Non-Users. *Substance Use & Misuse*, *36*(6-7), 807.
10. Choopanya, K., Martin, M., Suntharasamai, P., Sangkum, U., Mock, P. A., Leethochawalit, M., … Vanichseni, S. (2013). Antiretroviral prophylaxis for HIV infection in injecting drug users in Bangkok, Thailand (the Bangkok Tenofovir Study): a randomised, double-blind, placebo-controlled phase 3 trial. *The Lancet*, *381*(9883), 2083–2090. doi:10.1016/S0140-

6736(13)61127-7
11. Crandall, L. A., Metsch, L. R., McCoy, C. B., Chitwood, D. D., & Tobias, H. (2003). Chronic drug use and reproductive health care among low-income women in Miami, Florida: a comparative study of access, need, and utilization. *The Journal Of Behavioral Health Services & Research*, *30*(3), 321–331.
12. Crawford, N. D., Amesty, S., Rivera, A. V., Harripersaud, K., Turner, A., & Fuller, C. M. (2013). Randomized, Community-Based Pharmacy Intervention to Expand Services Beyond Sale of Sterile Syringes to Injection Drug Users in Pharmacies in New York City. *American Journal of Public Health*, *103*(9), 1579–1582.
13. Crawford, N. D., Blaney, S., Amesty, S., Rivera, A. V., Turner, A. K., Ompad, D. C., & Fuller, C. M. (2011). Individual- and Neighborhood-Level Characteristics Associated with Support of In-Pharmacy Vaccination among ESAP-Registered Pharmacies: Pharmacists' Role in Reducing Racial/Ethnic Disparities in Influenza Vaccinations in New York City. *Journal of Urban Health*, *88*(1), 176–185. doi:10.1007/s11524-010-9541-6
14. Crawford, N. D., & Vlahov, D. (2010). Progress in HIV reduction and prevention among injection and non-injection drug users. *Journal of Acquired Immune Deficiency Syndromes (1999)*, *55*(Suppl 2), S84.
15. Estimated Percentages and Characteristics of Men Who Have Sex with Men and Use Injection Drugs — United States, 1999–2011. (n.d.). Retrieved September 11, 2014, from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6237a2.htm
16. Fuller, C. M., Galea, S., Caceres, W., Blaney, S., Sisco, S., & Vlahov, D. (2007). Multilevel community-based intervention to increase access to sterile syringes among injection drug users through pharmacy sales in New York City. *American Journal of Public Health*, *97*(1), 117.
17. Health Belief Model. (n.d.). Retrieved July 17, 2014, from http://www.utwente.nl/cw/theorieenoverzicht/Theory%20Clusters/Health%20Communication/Health_Belief_Model/
18. Heinzerling, K. G., Kral, A. H., Flynn, N. ., Anderson, R. L., Scott, A., Gilbert, M. L., … Bluthenthal, R. N. (2006). Unmet need for recommended preventive health services among clients of California syringe exchange programs: Implications for quality improvement. *Drug and Alcohol Dependence*, *81*(2), 167–178. doi:10.1016/j.drugalcdep.2005.06.008
19. Cisneros, G. (2009). Access to Healthcare Among Injection Drug Users at a Needle Exchange Program in Pittsburgh, PA. *Journal of Addiction Medicine*. Vol. 3 Issue 2 pg 89 - 94
20. Crawford, N.D., Amesty. S., Rivera, A.V., Harripersaud, K., Turner, A. Fuller, C.M. (2014). Community Impact of Pharmacy-Randomized Intervention to improve Access to Syringes and Services for Injection Drug Users. *Health Education & Behavior* 1-9 doi: 10.1177/1090198114529131
21. Kang, S.-Y., & Deren, S. (2009). Factors mediating and moderating the relationship between gender and utilization of health care among Puerto

Rican drug users in New York. *Drug and Alcohol Dependence*, *102*(1-3), 138–143. doi:10.1016/j.drugalcdep.2009.02.011
22. Kang, S.-Y., Goldstein, M. F., & Deren, S. (2006). Health Care Utilization and Risk Behaviors among HIV Positive Minority Drug Users. *Journal of Health Care for the Poor and Underserved*, *17*(2), 265–75.
23. Kapadia, F., Latka, M. H., Hagan, H., Golub, E. T., Campbell, J. V., Coady, M. H., … Strathdee, S. A. (2007). Design and Feasibility of a Randomized Behavioral Intervention to Reduce Distributive Injection Risk and Improve Health-Care Access Among hepatitisC virus Positive Injection Drug Users: The Study to Reduce Intravenous Exposures (STRIVE). *Journal of Urban Health*, *84*(1), 99–115. doi:10.1007/s11524-006-9133-7
24. Knowlton, A., Latkin, C., Schroeder, J., Hoover, D., Ensminger, M., & Celentano, D. (2001). Longitudinal predictors of depressive symptoms among low income injection drug users. *AIDS Care*, *13*(5), 549–559.
25. Knowlton, A. R., Hoover, D. R., Chung, S., Celentano, D. D., Vlahov, D., & Latkin, C. A. (2001). Access to medical care and service utilization among injection drug users with HIV/AIDS. *Drug and Alcohol Dependence*, *64*(1), 55–62. doi:10.1016/S0376-8716(00)00228-3
26. Knowlton, A. R., Hua, W., & Latkin, C. (2005). Social support networks and medical service use among HIV-positive injection drug users: implications to intervention. *AIDS Care*, *17*(4), 479–492. doi:10.1080/09540120512331313143 49
27. Krüsi, A., Wood, E., Montaner, J., & Kerr, T. (2010). Social and structural determinants of HAART access and adherence among injection drug users. *International Journal of Drug Policy*, *21*(1), 4–9. doi:10.1016/j.drugpo.2009.08.003
28. Linton, S. L., Celentano, D. D., Kirk, G. D., & Mehta, S. H. (2013). The longitudinal association between homelessness, injection drug use, and injection-related risk behavior among persons with a history of injection drug use in Baltimore, MD. *Drug and Alcohol Dependence*, *132*(3), 457–465. doi:10.1016/j.drugalcdep.2013.03.009
29. Lundgren, L., Chassler, D., Ben-Ami, L., Purington, T., & Schilling, R. (2005). Factors Associated with Emergency Room Use among Injection Drug Users of African-American, Hispanic and White European Background. *The American Journal on Addictions*, *14*(3), 268–280. doi:10.1080/10550490590949442
30. Lutnick, A., Case, P., & Kral, A. H. (2012). Injection Drug Users' Perspectives on Placing HIV Prevention and Other Clinical Services in Pharmacy Settings. *Journal of Urban Health : Bulletin of the New York Academy of Medicine*, *89*(2), 354–364. doi:10.1007/s11524-011-9651-9
31. McCoy, C., Metsch, L., Chitwood, D., & Miles, C. (2001). Drug Use and Barriers to Use of Health Care Services. *Substance Use & Misuse*, *36*(6-7), 789.
32. Mizuno, Y., Wilkinson, J. D., Santibanez, S., Rose, C. D., Knowlton, A.,

Handley, K., … Team, I. (2006). Correlates of health care utilization among HIV-seropositive injection drug users. *AIDS Care*, *18*(5), 417–425. doi:10.1080/09540120500162247
33. Mowbray, O., Perron, B. E., Bohnert, A. S. B., Krentzman, A. R., & Vaughn, M. G. (2010). Service Use and Barriers to Care among Heroin Users: Results from a National Survey. *The American Journal of Drug and Alcohol Abuse*, *36*(6), 305–310. doi:10.3109/00952990.2010.503824
34. Ouellet, L., Huo, D., & Bailey, S. L. (2004). HIV Risk Practices Among Needle Exchange Users and Nonusers in Chicago. *Journal of Acquired Immune Deficiency Syndromes September 1*, *37*(1), 1187–1196.
35. Reilly, K. H., Neaigus, A., Wendel, T., Marshall IV, D. M., & Hagan, H. (n.d.). Correlates of selling sex among male injection drug users in New York City. *Drug and Alcohol Dependence*. doi:10.1016/j.drugalcdep.2014.08.010
36. Reynolds, G. L., Wells, R. S., Fisher, D. G., & Cagle, H. H. (2006). Health Services Usage by Alaskan Injection Drug Users. *Journal of Ethnicity in Substance Abuse*, *5*(2), 23–34. doi:10.1300/J233v05n02_02
37. Riley, E. D., Wu, A. W., Junge, B., Marx, M., Strathdee, S. A., & Vlahov, D. (2002). Health Services Utilization by Injection Drug Users Participating in a Needle Exchange Program. *American Journal of Drug & Alcohol Abuse*, *28*(3), 497.
38. Rudolph, A. E., Standish, K., Amesty, S., Crawford, N. D., Stern, R. J., Badillo, W. E., … Fuller, C. M. (2010). A Community-Based Approach to Linking Injection Drug Users with Needed Services Through Pharmacies: An Evaluation of a Pilot Intervention in New York City. *AIDS Education and Prevention*, *22*(3), 238–251. doi:10.1521/aeap.2010.22.3.238
39. Sapra, K. J., Crawford, N. D., Rudolph, A.E., Jones, K.C., Benjamin, E.O., Fuller, C. M. (2013) Social Network Members' Roles and Use of Mental Health Services Among Drug Users in New York City. *Journal of Behavioral Health Services & Research* doi:101007/s11414-013-9355-x
40. Sambamoorthi, U., Warner, L. A., Crystal, S., & Walkup, J. (2000). Drug abuse, methadone treatment, and health services use among injection drug users with AIDS. *Drug and Alcohol Dependence*, *60*(1), 77–89.
41. Semple, S. J., Strathdee, S. A., Zians, J., & Patterson, T. L. (2012). Factors associated with experiences of stigma in a sample of HIV-positive, methamphetamine-using men who have sex with men. *Drug and Alcohol Dependence*, *125*(1-2), 154–159. doi:10.1016/j.drugalcdep.2012.04.007
42. Simmons, J., Rajan, S., & McMahon, J. M. (2012). Retrospective Accounts of Injection Initiation in Intimate Partnerships. *The International Journal on Drug Policy*, *23*(4), 303–311. doi:10.1016/j.drugpo.2012.01.009
43. Small, W., Wood, E., Lloyd-Smith, E., Tyndall, M., & Kerr, T. (2008). Accessing care for injection-related infections through a medically supervised injecting facility: A qualitative study. *Drug and Alcohol Dependence*, *98*(1–2), 159–162. doi:10.1016/j.drugalcdep.2008.05.014

44. Social Network Members' Roles and Use of Mental Health Services Among Drug Users in New York City - Springer. (n.d.). doi:10.1007/s11414-013-9355-x
45. Sohler, N. L., Wong, M. D., Cunningham, W. E., Cabral, H., Drainoni, M.-L., & Cunningham, C. O. (2007). Type and Pattern of Illicit Drug Use and Access to Health Care Services for HIV-Infected People. *AIDS Patient Care and STDs*, *21*(s1), S–68. doi:10.1089/apc.2007.9985
46. Van Boekel, L. C., Brouwers, E. P. M., van Weeghel, J., & Garretsen, H. F. L. (2013). Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: Systematic review. *Drug and Alcohol Dependence*, *131*(1–2), 23–35. doi:10.1016/j.drugalcdep.2013.02.018
47. Vlahov, D., Robertson, A. M., & Strathdee, S. A. (2010). Prevention of HIV Infection among Injection Drug Users in Resource-Limited Settings. *Clinical Infectious Diseases*, *50*(s3), S114–S121. doi:10.1086/651482
48. Wood, E., Kerr, T., Tyndall, M. W., & Montaner, J. S. (2008). A review of barriers and facilitators of HIV treatment among injection drug users. *Aids*, *22*(11), 1247–1256.
49. Young, A. M., Larian, N., & Havens, J. R. (2014). Gender differences in circumstances surrounding first injection experience of rural injection drug users in the United States. *Drug and Alcohol Dependence*, *134*, 401–405. doi:10.1016/j.drugalcdep.2013.10.013

Table 1. Distribution of the population characteristics across each outcome (N = 615)

Demographics	***n***	***%***
Age		
< 44	305	49.59
≥ 44	310	50.41
Gender^		
Male	441	71.71
Female	169	28.29
Race		
Non-Hispanic White	81	13.19
Non-Hispanic Black	164	26.71
Latino	312	50.81
Other	57	9.28
Socioeconomic		
Education		
High School (<HS, HS, GED)	469	76.26
College and higher	146	23.74
Legal Income		
≤ $5,000	433	71.16
> $5,000	177	28.94
Marital Status		
Single	478	77.72
Married/Partner	137	22.28
Medical insurance		
No	109	17.72
Yes	506	82.28
Homelessness (prior 6 months)		
No	399	63.88
Yes	216	35.12
Employment status		
Unemployed	533	86.67
Employed	82	13.33
HIV Status*		
Negative	516	84.45
Positive	81	13.26
Drug treatment (any)~	597	97.07
Case management (any)^^	262	42.67
Dependent Variables		
Access to Care		
See same provider	366	61.10
Usual source	560	91.95
Service Utilization (prior 6 months)		
Emergency room	341	55.45
Clinic	494	80.33
Medical office	487	79.19
Mobile medical unit	508	82.60
Hospital	462	75.12
Healthcare Barriers^^^		
Personal	380	61.79
Structural	198	32.20

Mean Age (IQR) 43 (19-68).

^Gender = Other(5) excluded from table.

*Don't know/Refused to answer HIV status question n=14 (2.29%) not shown

~Drug treatment included any of Methadone treatment, detox, residential therapeutic community, narcotics anonymous, drug counselling or other kinds of treatment

^^Case Management includes seeing a case manager, social worker, or counselor for assistance with legal services, employment, medical care, substance abuse treatment, housing assistance, food stamps, insurance, mental health or medical care

^^^Personal barriers include forgot to go; missed appointment(s); too busy to go; feel good, didn't need to go to a health provider; moved or out of town; and drinking or using drugs. Structural barriers didn't have money or insurance to pay; unable to get transportation; inconvenient location, hours, time etc.; didn't know where to go; and on the street.

Table 2. Prevalence of each outcome among each group in the population (N = 615)

	Access %				*Service Utilization %*									*Barriers %*			
Demographics	***Same Provider***	***p-value***	***Usual Source***	***p-value***	***ER***	***p-value***	***Clinic***	***p-value***	***Medical Office***	***p-value***	***Mobile Unit***	***p-value***	***Hospital***	***p-value***	***Personal***	***p-value***	***Structural***	***p-value***
Age																		
< 44	54.98	0.003*	87.71	0.000*	59.67	0.036*	81.31	0.541	79.34	0.924	83.28	0.660	76.07	0.591	52.89	0.037	40.00	<.0001
≥ 44	66.88		96.10		51.29		79.35		79.03		81.94		74.19		57.74		24.52	
Gender^																		
Male	57.94	0.023*	91.06	0.231	56.24	0.507	80.73	0.680	81.41	0.061	84.81	0.022*	78.00	0.004*	60.09	0.123	31.52	0.601
Female	68.07		94.05		53.25		79.29		74.56		76.92		66.86		66.86		33.73	
Race																		
Non-Hispanic White	60.76	0.086	91.25	0.076	51.85	0.804	72.84	0.128	74.07	0.620	80.25	0.906	69.14	0.617	58.02	0.862	48.15	0.001*
Non-Hispanic Black	67.28		96.93		56.71		81.71		78.66		82.32		75.61		62.20		24.39	
Latino	56.62		89.94		54.81		82.69		80.77		83.65		76.28		62.82		30.45	
Other	69.09		89.47		59.65		73.68		78.95		82.46		75.44		59.65		40.35	
Socioeconomic																		
Education																		
High School (<HS, HS, GED)	60.79	0.784	91.36	0.340	56.29	0.451	82.52	0.015*	81.02	0.048*	82.73	0.880	77.40	0.019*	63.11	0.220	30.28	0.068
College and higher	62.07		93.84		52.74		73.29		73.29		82.19		67.81		57.53		38.36	
Legal Income																		
≤ $5,000	58.57	0.021*	90.40	0.021*	57.04	0.281	81.29	0.252	78.29	0.218	82.91	0.896	77.83	0.036*	64.90	0.007*	33.72	0.247
> $5,000	68.39		96.05		51.98		77.40		82.49		83.05		69.49		53.67		28.81	
Marital Status																		
Single	61.03	0.944	92.81	0.149	56.28	0.440	80.33	0.990	80.33	0.191	80.96	0.047*	76.36	0.185	60.88	0.386	32.22	0.982
Married/Partner	61.36		88.97		52.55		80.29		75.18		88.32		70.80		64.96		32.12	
Medical insurance																		
No	31.07	<.0001*	80.56	<.0001*	58.72	0.449	73.39	0.046*	74.31	0.168	86.24	0.271	77.06	0.605	57.80	0.380	44.95	0.002*
Yes	67.34		94.41		54.74		81.82		80.24		81.82		74.70		62.65		29.45	
Homelessness																		
No	67.18	<.0001*	92.15	0.807	51.63	0.011*	82.71	0.044*	78.70	0.684	82.21	0.724	75.44	0.804	60.40	0.336	27.07	<.0001*
Yes	49.76		91.59		62.50		75.93		80.09		83.33		74.54		64.35		41.67	
Employment status																		
Unemployed	63.13	0.014*	92.03	0.860	54.97	0.545	81.43	0.082	79.74	0.392	82.55	0.933	75.98	0.208	61.91	0.870	31.71	0.509
Employed	48.15		91.46		58.54		73.17		75.61		82.93		69.51		60.98		35.37	
Health Care Access																		
HIV Status*																		
Negative	55.09	<.0001*	91.21	0.143	55.43	0.982	79.65	0.246	78.10	0.148	82.75	0.789	75.19	0.793	61.82	0.533	34.30	0.003*
Positive	92.51		96.20		55.56		85.19		85.19		83.95		76.54		65.43		17.28	
Drug treatment (any)~	61.41	0.359	92.39	0.034*	55.11	0.335	80.23	0.745	78.89	0.314	82.41	0.480	74.71	0.187	61.81	0.952	32.33	0.800
Case management (any)^^	63.28	0.023*	93.82	0.021*	51.91	0.355	79.39	0.236	77.48	0.667	79.77	0.019*	70.61	0.136	61.83	0.021*	40.46	0.000*

*P <0.05

Table 3. Bivariate relationships between the dependent variables and dichotomous independent variables among injection drug users in PHARM-Link study: Odds Ratios and 95% Confidence Intervals

	Access to care						Service Utilization								Barriers			
	Same provider		Usual source		ER		Clinic		Medical Office		Mobile Unit		Hospital		Personal		Structural	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age																		
Young	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_
Older	1.65	1.18 - 2.30*	3.45	1.76 - 6.76*	0.71	0.51 - 0.97*	0.88	0.59 - 1.31	0.98	0.66 - 1.44	0.91	0.60 - 1.38	0.90	0.62 - 1.30	1.14	1.02 - 1.96*	0.48	0.34 - 0.68*
Gender																		
Male	1.00	_	1.00		1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_
Female	1.54	1.06 - 2.26*	1.55	0.75 - 3.18	0.88	0.62 - 1.26	0.91	0.58 - 1.42	0.66	0.43 - 1.02	0.59	0.38 - 0.92*	0.56	0.38 - 0.84*	1.34	0.92 - 1.94	1.10	0.75 - 1.61
Race																		
Non-Hispanic White	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_	1.00	_
Non-Hispanic Black	1.32	0.76 - 2.32	3.03	0.93 - 9.86	1.21	0.71 - 2.07	1.78	1.00 - 3.15	1.47	0.83 - 2.60	1.26	0.67 - 2.35	1.43	0.83 - 2.46	1.22	0.74 - 2.01	0.41	0.28 - 0.77*
Latino	0.84	0.50 - 1.39	0.85	0.36 - 2.02	1.12	0.69 - 1.83	1.66	0.88 -3.12	1.29	0.69 - 2.40	1.14	0.58 - 2.25	1.38	0.76 - 2.49	1.19	0.69 - 2.04	0.34	0.19 - 0.61
Other	1.44	0.69 - 2.99	0.81	0.25 - 2.56	1.37	0.69 - 2.72	1.04	0.48 - 2.24	1.31	0.58 - 2.94	1.15	0.48 - 2.77	1.37	0.63 - 2.94	1.06	0.53 - 2.13	0.72	0.36 - 1.44
Legal Income (>$5,000)	1.55	1.06 - 2.25*	2.62	1.15 - 5.95*	0.82	0.58 - 1.17	0.77	0.50 - 1.19	1.32	0.84 - 2.07	1.03	0.64 - 1.64	0.65	0.44 - 0.97*	0.61	0.43 - 0.88*	0.79	0.54 - 1.16
Health Insurance (yes)	4.57	2.89 - 7.22*	4.07	2.21 - 7.50*	0.85	0.55 - 1.29	1.63	1.00 - 2.63*	1.40	0.86 - 2.27	0.71	0.39 - 1.29	0.87	0.53 - 1.43	1.22	0.80 - 1.86	0.51	0.33 - 0.78*
HIV Status (positive)	10.05	4.29 - 23.53*	2.44	0.74 - 8.05	1.00	0.62 - 1.61	1.46	0.76 - 2.81	1.61	0.84 -3.08	1.09	0.57 - 2.05	1.07	0.62 - 1.86	1.16	0.71 - 1.91	0.40	0.21 - 0.73*
Homelessness (yes)	0.48	0.34 - 0.68*	0.92	0.50 - 1.70	1.56	1.11 - 2.19*	0.65	0.43 - 0.98*	1.08	0.72 - 1.64	1.08	0.69 - 1.68	0.95	0.65 - 1.39	1.18	0.84 - 1.66	1.93	1.35 - 2.72*
Marital Status (married)	1.01	0.68 - 1.50	0.62	0.32 - 1.18	0.86	0.58 - 1.26	0.99	0.61 - 1.60	0.74	0.47 - 1.16	1.77	1.00 - 3.14*	0.75	0.49 - 1.14	1.19	0.80 - 1.77	0.99	0.66 - 1.49
Education (some college)	1.05	0.72 - 1.55	1.43	0.68 - 3.04	0.86	0.59 - 1.25	0.58	0.37 - 0.90*	0.64	0.41 - 0.99*	0.96	0.59 - 1.56	0.61	0.40 - 0.92*	0.79	0.54 - 1.15	1.43	0.98 - 2.11
Employment status (yes)	0.54	0.33 - 0.86*	0.92	0.40 - 2.14	1.15	0.72 - 1.85	0.62	0.36 - 1.06	0.78	0.45 - 1.36	1.02	0.55 - 1.90	0.72	0.43 - 1.20	0.96	0.59 - 1.54	1.17	0.72 - 1.92
Treatment (any)	1.59	0.58 - 4.29	3.26	1.09 - 10.97*	1.62	0.60 - 4.39	1.23	0.35 - 4.32	2.14	0.48 - 9.43	1.70	0.38 - 7.53	2.70	0.61 - 11.91	1.03	0.39 - 2.69	0.80	0.28 - 2.29
Case Management (any)	1.85	1.08 - 3.15*	2.40	1.13 - 5.08*	1.27	0.76 - 2.14	1.55	0.74 - 3.25	1.15	0.59 - 2.23	3.44	1.22 - 9.70* #	1.67	0.85 - 3.29	1.84	1.09 - 3.09*	0.95	0.54 - 1.66

*Statistically significant bivariate associations

Table 4. Multivariate Logistic models of Dependent variables and Independent variables among injection drug users in PHARM-Link study: Odds Ratios and 95% Confidence Intervals

	Access to care						Service Utilization								Barriers			
	Same provider		Same location		ER		Clinic		Medical Office		Mobile Unit		Hospital		Personal		Structural	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age																		
Young	1.00	_	1.00	_	1.00	_	_	_	_	_	_	_	_	_	1.00	_	1.00	_
Older	1.23	0.84 - 1.86	2.85	1.42 - 5.73*	0.74	0.54 - 1.03	_	_	_	_	_	_	_	_	0.73	0.52 - 1.02	0.58	0.40 - 0.85*
Gender																		
Male	1.00	_	_	_	_	_	_	_	_	_	1.00	_	1.00	_	_	_	_	_
Female	1.33	0.87 - 2.03	_	_	_	_	_	_	_	_	0.52	0.33 - 0.83*	0.54	0.36 - 0.81*	_	_	_	_
Race			_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Non-Hispanic White	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	1.00	_
Non-Hispanic Black	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	0.49	0.14 - 0.83*
Latino	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	0.47	0.25 - 0.86*
Other	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	0.79	0.38 - 1.64
Legal Income (yes)	1.60	1.03 - 2.48*	2.12	0.91 - 4.92	_	_			_	_	_	_	0.70	0.47 - 1.05	0.64	0.45 - 0.92*	_	_
Health Insurance (yes)	4.11	2.48 - 6.79*	3.42	1.81 - 6.46*	_	_	1.51	0.93 - 2.46	_	_	_	_	_	_	_	_	0.60	0.38 - 0.94*
HIV Status (positive)	7.64	3.18 - 18.36*	_	_	_	_			_	_	_	_	_	_	_	_	0.53	0.28 - 0.99*
Homelessness (yes)	0.63	0.43 - 0.92*	_	_	1.49	1.06 - 2.11*	0.67	0.45 - 1.02	_	_	_	_	_	_	_	_	1.62	1.13 - 2.39*
Marital Status (married)	_	_	_	_	_	_			_	_	1.95	0.28 - 0.91*	_	_	_	_	_	_
Education (some college)	_	_	_	_	_	_	0.59	0.38 - 0.92*	0.64	0.41 - 0.99*	_	_	0.63	0.41 - 0.96*	_	_	_	_
Employment status (yes)	0.66	0.38 - 1.15	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Treatment (yes)	_	_	1.62	0.40 - 6.45	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Case Management (yes)	1.09	0.74 - 1.60	1.63	0.85 - 3.13	_	_	_	_	_	_	1.51	0.99 - 2.33 #	_	_	1.03	0.74 - 1.45	_	_

*Statistically significant multivariate associations