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Evaluating the association between substance use stigma and sharing drug injection equipment: results from the New Orleans NHBS-IDU Cycle, 2018

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Abstract

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By Jeremy Beckford

Background: People who inject drugs are at an increased risk for acquiring HIV and HCV due to sharing of injection equipment. Deaths associated with HCV have historically accounted for a large proportion of deaths due to infectious diseases. This contributes to the health risks that are present when sharing syringes and other equipment used for injecting drugs. This study examines the relationship between substance use stigma and the prevalence of sharing drug injection equipment.

Methods: Data was used from the National HIV Behavioral Surveillance System during the Injection Drug Use cycle during 2018 (NHBS-IDU5). Multivariable models were developed to assess the relationship between participants' reported substance use stigma and the prevalence of injecting with syringes used by others as well as using other drug injecting equipment that was previously used by others. Stigma was examined using three methods. The first measured total stigma. The next method examined stigma as a composite including factors related to enacted, anticipated, and internalized stigma. The last method examined stigma as a composite including factors related to internalized stigma as well as stigma from health care workers and family members.

Results: Adjusting for other covariates, all three categories representing higher levels of enacted stigma were associated with a significant increase in the prevalence of sharing any injection equipment (Model 1b Enacted Stigma; 2, aPR 1.4, CI 1.1-1.7; 3, aPR 1.6, CI 1.2-1.9; 3, aPR 1.4, CI 1.1-1.8).

Conclusions: Substance use stigma may reduce the efficacy of programs focused on the health and well-being of those who use drugs. A further evaluation of the multiple ways substance use stigma affects the lives of people who use drugs will contribute to the understanding of this issue. In reducing substance use stigma, programs that interact with people who use drugs may not only increase their utilization, but also the quality of the services they provide.

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Chapter 1

Introduction

The opioid epidemic has drastically increased the level of attention that illicit substance use has received in the United States. Although substance use is and has been common in the U.S. historically, an increasing number of lives are being affected during the ongoing opioid epidemic. The Centers for Disease Control and Prevention reported over 67,000 overdoses occurring in the U.S. during 2018 and over 47,000 of those involved opioids (Centers for Disease Control and Prevention, 2020a). While the number of people who use opioids has steadily grown, the nature of the increase has changed. Opioid overdose deaths have been attributed to increases in prescription opioids, then heroin, and now synthetic opioids (Centers for Disease Control and Prevention, 2020b). With this increase in opioid use, especially illicit opioid use, there has been an increase in injection drug use. Injecting drugs intravenously amplifies the effect and the speed at which substances enter the blood stream, increasing the risk of an overdose. Overdoses are the most immediate health risk for people who inject drugs (PWID) and their communities. However, overdoses are just one out of numerous negatives health outcomes PWID are at an increased risk for. The risk of a fungal or bacterial infection is also increased when injection equipment is not sterile and proper wound care is not practiced. Sharing syringes and other injection equipment contributes to the spreads HIV and the hepatitis C virus (HCV). According to the American Association for the Study of Liver Diseases, injection drug use accounts for approximately 70% of new HCV infections (American Association for the Study of Liver Disease, 2019). This risk is compounded due to many PWID being unaware of their HCV status, and the long latency period of HCV. This latency period belies the deathly toll of HCV. The number of HCV-related deaths accounts for more deaths than HIV and 59 other infectious diseases combined since 2013 (Liang & Ward, 2018).

In order to effectively reduce the negative health outcomes for PWID, it will be necessary to consider all of the risks associated with injection drug use and develop methods to mitigate them.

Treatment programs which help individuals abstain from drug use can reduce or eliminate some risk, especially risks related to the sharing of drug injection equipment. However, some individuals are not ready or able to abstain from drug use completely. The increasing number of lives affected by substance use, due to deaths and other negative health outcomes provide further incentive to not only focus on an abstinence only approach, but on a harm reduction model when developing programs focusing on substance use. One such principle states that licit and illicit drug use is a part of the society and efforts should focus on reducing the harmful effects and not on ignoring or condemning them (Des Jarlais, 1995; Harm Reduction Coalition, 2011). The harm reduction model emphasizes a practical approach based on the evidence-based assumption that an abstinence only approach will not be sufficient to meet the needs of those who use substances. Therefore, it is imperative to provide services which include medically assisted treatments as well as those focused on helping individuals use drugs in a safer manner. This includes programs aimed at reducing overdoses as well as increasing access to sterile drug equipment. In short, increasing access to naloxone, sterile syringes, and other equipment used when injecting drugs should be viewed as a way to reducing the harms of substance use. One example of the benefits of the harm reduction approach has been shown in a study which reports on data from an unsanctioned safe consumption site where individuals come in and use illicit drugs including opioids. From 2014 to 2019 there were over 10,500 injection events, 33 overdoses, and no overdose deaths (Kral et al, 2020). However, programs focused on reducing the harms of substance use will have a limited impact if they are not fully utilized. Unfortunately, there are numerous barriers in place which reduce the accessibility of these services for PWID.

Although there has been a shift to view addiction and substance abuse as a public health issue, there are legal obstacle to fully implementing this approach. There are significant legal penalties associated with illicit drug use. PWID are especially exposed to these legal risks due to the equipment associated with injection drug use. An example of this is the fact that in many states, syringes containing drug residue can be used as a means of criminal prosecution (Burris et al, 2002).

Location not only determines the legal risk for possessing used syringes, but it can also be a barrier for accessing sterile syringes. Depending on the location, there can be several syringe service programs (SSPs) operating legally, or it may be illegal for an SSP to operate at all (American Foundation for AIDS Research, n.d.). An individual's willingness to go to a treatment facility or an SSP is also a point of concern. Despite treatment facilities focusing on helping people deal with substance abuse, having engaged in treatment services is often associated with increased levels of stigma (Semple et al, 2005; Bozinoff et al, 2018). Experiences of substance use stigma may also reduce the effectiveness of SSPs. Providing sterile syringes to help reduce the spread of disease is a major focus for SSPs and this is accomplished by making sterile syringes and other drug injection equipment accessible. However, PWID who reported discrimination from SSP staff were also more likely to use syringes that were not sterile, including reusing their own syringe or using a syringe someone else had previously injected with (Wilson et al, 2014).

Stigma

Stigma consistently plays a role in public health. The effects of stigma can be compounded due to the multitude of stigmatized groups and the associated barriers that are present for them. Examples include poor treatment of people living with HIV due to beliefs that they acquired HIV due to their sexual identity as a gay or bisexual male, being someone who engages in sex work, or a PWID. These individuals will have to deal with the stigma associated with HIV, in addition to the stigma and discrimination that is levied against the specific group. The influence of stigma has been shown to negatively impact health. Research has shown that HIV/AIDS stigma has negative effects on HIV care and HIV care-seeking behaviors (Vanable et al, 2006). The association between HIV stigma and HIV care can partially be attributed to the fear of discrimination that individuals have (Bogart et al, 2007). Although major strides have been made, HIV stigma remains a prominent barrier to care. Fear of stigma can lead to avoidance of HIV testing or treatment, leading to poor health outcomes and increasing the rate of HIV transmission.

Pre-exposure prophylaxis (PrEP) offers a highly effective tool in the prevention of the spread of HIV. However, for many at-risk populations, PrEP uptake has been slow in comparison to new HIV diagnoses (Siegler et al, 2018). The use of PrEP, which contains medication that is used to treat HIV, is also not free of stigma. In conjunction to individuals not wanting others to think they have HIV, there is concern around being perceived to engage in stigmatized behaviors linked to HIV infection (Golub, 2018). These are just a few ways in which stigma has impeded public health concerns in the field of HIV and impacted individual behaviors.

Stigma affects various domains in the lives of PWID. The available research that focuses on stigma amongst PWID uses various types of stigma scales and, subsequently, definitions of stigma. Link and Phelan (2001, p 377) have provided a thorough and concise conceptualization of stigma which states, "stigma exists when elements of labeling, stereotyping, separation, status loss, and discrimination occur together in a power situation that allows them." In order to more fully conceptualize stigma, and to show its impact, the four components they listed are explained in more detail below. In addition, the specific relevance to PWID is considered when looking at each component.

The first component necessary for the conceptualization of stigma is labeling. By developing labels, social and cultural categories can more easily be differentiated. When considering drug use, there are many labels that are used. Labels can be used to differentiate types of health risk among people who use drugs (PWUD). The method of use, type of drug used, and frequency of drug use are all important when considering which resources someone can benefit from utilizing. These can range from naloxone for people who use opioids, syringes for those who inject drugs, to clean rolling papers to use when snorting cocaine or other substances. The social and cultural context is also influential when determining whether specific behaviors are labeled or not.

The second component of stigma involves the use of labeling to generate stereotypes. For stigmatized groups, labels they have been given are often associated with negative attributes which in turn form detrimental stereotypes. While some labels have medical relevance, others are more

detrimental in nature. Labels such as drug addict or simply letting others know someone is addicted to drugs will cause some to believe that person is unpredictable and a danger to others (Crisp et al, 2000). Perceptions like weak, unreliable, and unstable persist even after interventions to change the stereotypes of people who use heroin (Wilks & Austin, 1991). Negative stereotypes are more readily attributed towards individuals with substance use disorders than those with other psychiatric disorders (Yang et al, 2017).

Once differences are established, the separation of the stigmatized group becomes easier. Separation, the third component, relies on the negative stereotypes affixed to the labeled identities. Morone writes extensively about community and who is allowed to be a part of said community in an essay on the moral dimension of public health (Morone, 1997). Morone argues that forming communities and viewing others as outsiders not only has a deep history within the United States, but that this ideology adapts and persists. There is a wide range of identities who have been refused acceptance into the community which includes those with different nationalities, races, genders, sexual orientations, and certain health conditions. How closely negative labels are affixed to individuals or groups of people is determined by whether those individuals or groups are deemed to be within the community or not. This is exemplified perfectly by Link and Phelan (2001, p 370) when they state, "A person *has* cancer, heart disease, or the flu – such a person is one of us, a person who just happens to be beset by a serious illness. But a person *is* a schizophrenic." The semantics and underlying separation between those seen as members of the community and those who are not has ongoing effects.

The final component encompasses status loss and discrimination. According to Link and Phelan, "when people are labeled, set apart, and linked to undesirable characteristics, a rationale is constructed for devaluing, rejecting, and excluding them" (Link & Phelan 2001, p 370). It is important to remember that discrimination can take many forms. Discriminatory actions have historically been widely accepted and often written into law. Common examples include segregation and gender disenfranchisement. Conceptualizing stigma as the interplay of these four components provides a

useful framework for viewing the effects of stigma, especially when viewed from a public health perspective.

Literature Review

Study Sample Demographics

Although there are differences in terms of risk behaviors between PWID and those who do not inject drugs, there is a meager amount of research that focuses on substance use stigma only from the perspective of PWID. Often, research will simply focus on PWUD, a broader category that includes PWID and those who use drugs through alternative methods. In order to present a more robust review of the literature that focuses on substance use stigma, studies of PWUD, including some exclusively focused on PWID, are described below. The literature review includes eight peer-reviewed articles on stigma among PWUD in the U.S. published from 2005 through 2019. Seven of the studies reported on the percentage of PWID enrolled with one study only consisting of only PWID. One study did not report on the number of PWID enrolled. Four studies included HIV status as a criterion for study participation resulting in two studies that consisted of only HIV negative or positive individuals. None of the studies reported on HCV status. Only two studies included variables relating to sharing syringes. The majority of the study participants were males. The mean age of participants ranged from 32 to 45 years and the racial and ethnic identities and geographic settings varied.

Study Summaries

The study aims primarily focused on finding relationships between health-care utilization and substance use stigma. Out of the three studies that presented models with health-care utilization as an outcome, two used engagement in treatment programs (Semple et al, 2005; Louma et al, 2007), and the third used optimal adherence to antiretroviral therapy (ART) (Stringer et al, 2019). Three other studies used stigma scores as the outcome for regression models that included variables related to

socio-demographics, substance use, psychosocial factors, treatment, and SSP use (Semple et al, 2012; Rivera et al, 2014; Bozinoff et al, 2018). The remaining two studies constructed models which used a score for substance use problems (Kulesza et al, 2017) and experiences with non-fatal overdoses (Latkin et al, 2019).

Researchers found that, among HIV negative individuals who use methamphetamines, experiences of rejection were associated with higher odds of history of treatment (Semple et al, 2005). The same study also showed that stigma coping strategies were associated with lower odds of history of treatment. Another study was conducted on individuals entering substance abuse treatment (Louma et al, 2007). Their results also showed that increases in stigma-related rejection was related to an increased number of treatment episodes. This suggested that engaging in treatment services for substance use may be stigmatizing for PWUD. Researchers have showed decreased odds of optimal ART adherence for those who experienced higher levels of substance-use stigma (Stringer et al, 2019).

In a study conducted among HIV positive men who had sex with men who used methamphetamines, multiple factors were associated with experiences of stigma (Semple et al, 2012). Factors that were associated with an increase in experiences of stigma included anger symptoms, binge and injection use of methamphetamine, and having ever been in treatment for methamphetamine use. Emotional support was found to be associated with a decrease in experiences of stigma. It was reported that those of Latin ethnicity, lower educational attainment, and less than 100% pharmacy or SSP use were more likely to have PWID-related stigma (Rivera et al, 2014). An examination of factors related to General Self-Stigma as well as treatment stigma among people with opioid use disorder has been done for those entering an inpatient detoxification program (Bozinoff et al, 2018). Having injected drugs in the past 30 days and having previously been admitted to a detoxification program were associated with increased General Self-Stigma scores. In addition to previous admission to a detoxification program, years of education and having ever been prescribed naltrexone were associated with increased treatment stigma scores.

In a study where 47% of the participants had an opioid use disorder, internalized stigma was associated with an increase in substance use problems (Kulesza et al, 2017). Having an opioid and/or alcohol use disorder and alcohol use were also associated with an increase in substance use problems. However, increases in age were associated with a decrease in substance use problems. Stigma, the total number of drug use settings, and having injected heroin and/or speedball were all associated with an increased odds of experiencing a non-fatal overdose (Latkin et al, 2019). Having shared syringes or other injection equipment were not associated with experiencing an overdose.

Limitations

Six of the research articles focused on the correlates of various forms of health-care utilization and substance use stigma. Six of the studies utilized convenience sampling while two used respondent driven sampling. The majority of the substance use scales were modified from previously validated mental health scales. Although one study specifically examined non-fatal overdoses, none of the eight studies prioritized sharing of injection equipment in their studies. Sharing syringes and other injection equipment poses a significant risk for the spread of HIV and HCV. Increasing the understanding of the relationship between sharing injection equipment and various forms of substance use stigma will provide valuable information for public health programs that aim to improve the health and well-being of PWID.

It is important to make sure SSPs are accessible to reduce the risk of HIV, HCV, and other infectious diseases. However, access to SSPs is not the only factor that affects a person's injection behaviors. A better understanding of the relationship between injection related risks and substance use stigma will be necessary to inform programs aimed at improving the health of PWID. Despite the U.S. being in the midst of an opioid epidemic, there is scant research that has focused on substance use stigma from the perspective of those who engage in substance use. There is even less research that focuses on injection behaviors which contributes a major risk for the spread infectious diseases.

The current study aims to better understand the relationship between substance use stigma and the sharing of injection equipment amongst persons who have injected drugs in the past 12 months.

Chapter 2

Introduction

The ongoing opioid epidemic taking place in the U.S. continues to be a major public health concern. While the number of people who have been affected by opioid use during this epidemic has increased, the nature of the epidemic has changed. While opioid related overdose deaths have increased, there have been three distinct waves representing specific increases in overdose deaths from prescriptions opioids, heroin, and then synthetic opioids (Centers for Disease Control and Prevention, 2020b). When considering the negative effects of illicit opioid use, it is especially important to focus on PWID. Using opioid intravenously not only increases a person's risk for having an overdose, but it also introduces a multitude of other risks including fungal, bacterial, and viral infections (Hartnett et al, 2019; American Association for the Study of Liver Disease, 2019). With numerous health risk affecting PWID, it is imperative to utilize a harm reduction approach when planning health interventions and providing health care services. The harm reduction model emphasizes utilizing a variety of methods to mitigate risks associated with drug use. For people currently injecting drugs, it is important to provide access to interventions focusing on helping curb substance use while also focusing on interventions which reduce opioid overdose and the spread of infectious diseases. In 2018, 7% of the new HIV infections in the U.S. were attributed to the sharing of syringes and approximately 70% of all new HCV infections are attributed to injection drug use (Centers for Disease Control and Prevention, 2018; American Association for the Study of Liver Disease, 2019).

The creation of programs and policies that focus on the health and well-being of PWID is one component of what needs to be done to help counteract the opioid epidemic. While these

programs and policies are being put into place, it is important to focus on increasing their efficiency and utilization. The relationship between stigma and the behaviors of PWID has often been overlooked. In the limited amount of research that exists on substance use stigma amongst PWUD, associations have been found between increased levels of stigma and engaging in treatment programs as well as sharing injection equipment (Semple et al, 2005; Bozinoff et al, 2018; Latkin et al, 2010). Programs focused on decreasing substance use and on improving the health of PWID should also ensure that they are not further contributing to the stigma of substance use, which can contribute to the very risks that they are trying to prevent. For this to happen, it will be necessary to have a better understanding of what influences the risk behaviors of PWID.

There are several limitations that are present when attempting to better understand the relationship between stigma and the risk behaviors of PWID. The limitation that is most readily present is the limited amount of research that focuses on stigma from the perspective of PWID and its association with risk behaviors including the sharing of injection equipment. When considering the ongoing opioid epidemic and the disproportionate risks PWID have for contracting HIV and HCV, the limited amount of research focused on those within the U.S. is especially surprising. In the research focused on the stigma that PWID face, there is a lack of consensus on how stigma is defined and measured. Researchers will create their own stigma scale or use modified scales that originated from the field of mental health or HIV/AIDS stigma. With additional research focused on PWID and the stigma they encounter, there will be increased attention defining substance use stigma and validating the scales used amongst a varied population.

Current research involving stigma PWUD experience in the U.S. have predominantly focused on experiences around substance use treatment utilization. Several studies have found associates between experiencing increased levels of stigma and having engaged in substance use treatment programs one or more times (Semple et al, 2005; Louma et al, 2007; Bozinoff et al, 2018). There were two studies that showed that binge drug use and injection drug use were associated with increased levels of stigma (Semple et al, 2012; Bozinoff et al, 2018). Stigma was also shown to be associated with

lower odds of having optimal adherence to HIV medication and less than 100% use of pharmacies or SEPs for acquiring syringes (Stringer et al, 2019; Rivera et al, 2014). A study also showed that increased stigma was associated with an increased likelihood of experiencing a non-fatal overdose (Latkin et al, 2019).

In the research on substance use stigma PWID face in the U.S., not much is known about the relationship stigma has on sharing injection equipment. This behavior poses a significant risk for the spread of HIV and HCV. HCV-related deaths outpaces the combined death toll from HIV and 59 other infectious diseases combined (Liang & Ward, 2018). This study examines the association between substance use stigma and receptive injection equipment sharing behaviors amongst PWID.

Methods

Participants

The study consisted of participants who took part in the National HIV Behavioral Surveillance (NHBS) in New Orleans between July and November of 2018. The Centers for Disease Control and Prevention created NHBS to conduct behavioral surveillance for populations who are at an increased risk for HIV. The surveillance is conducted in rotating annual cycles focusing on men who have sex with men (MSM), high-risk heterosexuals (HET), and PWID (IDU). A total of 550 participants who had injected drugs within the past 12 months were enrolled using respondent driven sampling (RDS). Respondent driven sampling is ideal for recruiting a representative sample of people from hidden populations like PWID (Hecakthorn, 1997). The NHBS study and the recruitment methodology it uses have been described in detail previously (Gallagher et al, 2007).

Procedures

Participant responses were collected using computer-assisted personal interviews. The interviewers were trained, and informed consent was obtained prior to the interview and the interviews were kept anonymous. Participants were compensated for the interview ($20), HIV testing

($20), and for recruiting up to 5 other people that they knew ($10 per referral). Participants were also offered a free HCV antibody test.

Measures

The NHBS survey contains a core survey that is designed by the CDC and a local survey designed by each study site. Included in the core survey are questions related to demographics, sexual behaviors, behaviors around drug use, HIV and HCV status, and psychological distress. Many of the questions related to behaviors around drug use were focused on events occurring over the past 12 months. Two outcomes, one for sharing syringes and the other for sharing any injection equipment, were derived from a list of four questions related to the frequency of using sterile syringes and sharing behaviors listed in Appendix Table A1. Individuals who responded that they always used sterile syringes, or they did not use a needle after anyone else were categorized as not having shared syringes. Individuals who did not use any equipment after other people, including syringes, and did not use drugs that had been divided with a syringe someone else had used were categorized as not having shared any equipment. Both outcomes were dichotomized to represent whether an individual used a syringe or any other equipment that was previously used by another person within the past 12 months.

The Severity Dependence Scale (SDS) included in the local questions measured the degree of substance dependence experienced by survey respondents (Gossop et al, 1995). The SDS measures feelings related to drug use that relate to control, anxiety towards missing a dose, worry about drug use, hoping to stop, and difficulty stopping. The response options for the first four items are never, rarely, about half the time, most of the time, and always. The last item relating to difficulty stopping their drug of choice, the options are not difficult, difficult, very difficult, and impossible. Within the study population the SDS had an acceptable internal consistency with a Cronbach's alpha value of 0.76. A Poisson regression was used to calculate unadjusted and adjusted prevalence ratios for the confounders and stigma variables for each of the outcomes. Homelessness was measured as a

dichotomous variable comparing those who had been homeless at any time in the past 12 months to those who had not been homeless at any point during that time. The time since a participant's first injection experience was categorized in 5-year increments and any amount of time greater than 25 years.

Substance Use Stigma

Stigma was measured using a slightly modified multi-factor 18 item scale focused on PWUD which is listed in Appendix Table A2 (Smith et al, 2016). The 18-item scale contains three 6 question sections which measure enacted, anticipated, and internalized stigma. The enacted stigma scale measures differential treatment experienced in the past due to an individual's substance use. The anticipated stigma scale measures an individual's expectation to be treated differently due to their substance use. The internalized stigma scale measures how an individual's drug use history affects their feelings about themselves. The scale was modified to only focus on drug use by omitting "alcohol" from the section prompts and internalized stigma statements. The enacted and anticipated stigma scales focused on experiences with family members and healthcare workers. In addition to total stigma, this allowed for the individual measurements of enacted stigma, anticipated stigma, internalized stigma as well as stigma from family members and healthcare workers. The enacted stigma scale measured past negative experiences by family members and healthcare workers with response options of never, not often, somewhat often, often, and very often. The anticipated stigma scale measured the likelihood of future negative experiences by family members and healthcare workers with response options of very unlikely, unlikely, neither unlikely nor likely, likely, and very likely. The internalized stigma scale measured their negative feelings about themselves due to their drug use using the response options of strongly disagree, disagree, neither disagree nor agree, agree, and strongly agree. The response options were coded so that higher scores related to increased stigma. Each stigma component was recoded into four categories that represented each component of the Likert scale with the first two response options for each question (1-very unlikely, 2-unlikely)

being combined into the lowest stigma category. This resulted in four ranges for stigma that were used as categorical variables with the lowest level of stigma used as the reference category. The total stigma as well as each individual stigma scale all had a high internal consistency with Chronbach's alpha values of 0.83 or higher.

Statistical Analysis

Bivariate analyses were conducted using chi-squared tests to assess differences between groups with respect to sharing syringes and any injection equipment. For the multivariable analysis, confounders were determined a priori (Figure 1) using a directed acyclic graph approach. Age, the Severity Dependence Scale, and history of homelessness were included in the model to control for confounding. Age was categorized into four separate groups using those 50 years and older as the reference group. Those not having a history of homelessness were treated as the reference group and the Severity Dependence Scale was used as a continuous covariate with a scale of 0 - 19. Stigma was categorized in three different ways. The initial models used the composite score in the categorization of. Stigma was then further separated into 3 subgroups. The first model showing the different stigma subgroups used the enacted, anticipated, and internalized stigma factors. The final model showing the different stigma subgroups used factors for stigma from health care workers, stigma from family members, and internalized stigma.

Results

Sample Demographics

Demographic characteristics for the 418 respondents included in the study analysis are listed in Table 1. The majority of the sample identified as men (69.4%). The largest age category was among PWID between the ages of 30 to 39 years old (38.3%). This was followed by PWID in their 40s (29.9%), those between the ages of 18 – 29 years (17%), then those 50 and older (14.8%). The proportion of respondents in the six different categories measuring time since the first injection

experiences did not differ greatly with percentages ranging from 14.1% to 18.9% for the total sample. The drug injected most often was heroin (69.1%) followed by heroin and cocaine in combination (i.e., speedball, 21.1%). Methamphetamine (5.7%) and powder cocaine (2.4%) were also listed by respondents as the drug they injected most often. Nearly half of the respondents (47.1%) had injected with a syringe previously used by someone else and 78.2% had used any type of injection equipment after someone else. Only 19.9% of the respondents did not use any type of injection equipment, including syringes, after someone else. In the past 12 months 40% of the participants participated in a program to treat drug use. Over a quarter (26.3%) of the individuals who had not been to a drug treatment program in the past 12 months had tried to get into a drug treatment program but had been unable to. Overall 71.7% of participants who were insured, and 79.2% had seen a health care provider in the past 12 months.

Bivariate Analysis

There was a significant difference in syringe sharing behavior based on age and race (Table 1). Non-Hispanic Whites accounted for a larger percentage of those who shared syringes than they did for the study sample overall. Individuals between the ages of 18 – 29 were more likely to share syringes compared to those in other age categories. There were also differences in syringe sharing behavior among PWID based on how long ago they had first injected drugs. Those who had their first injection experience 6 – 10 years ago were more likely to share syringes compared to others. Individuals who had a positive HCV antibody test were more likely to share syringes as well as any type of injection equipment more than those who received a negative HCV antibody test. There was no difference in sharing behavior between those who were aware of their HCV antibody status compared to those who were unaware.

Multivariable Analysis

The models in Table 2 show unadjusted and adjusted prevalence ratios for key variables as well as factors relating to substance use stigma. Models 1a-1c examine the prevalence of having shared any injection equipment in the past 12 months from the date of the survey. Models 2a-2c examine the prevalence of having shared a syringe in the past 12 months from the date of the survey. In models 1a and 2a stigma is categorized to represent four different levels measuring total stigma. Models 1b and 2b examine four categories which measure enacted, anticipated, and internalized stigma independently. Models 1c and 2c examine categories of stigma from health care worker, from family members, and internalized stigma independently.

The adjusted models 1a-1c show that increases in substance dependence (SDS) are associated with a small but significant increase in the prevalence of having shared any type of injection equipment. The adjusted models 2a-2c show that those within the ages of 18 – 29 have a significantly higher prevalence of a history of syringe sharing behavior compared to those who are 50 years or age or older (Model 2a, aPR 1.6, CI 1.1-2.4; Model 2b, aPR 1.7, CI 1.2-2.5; Model 2c, aPR 1.7, CI 1.1-2.4). In the adjusted analysis which treated enacted, anticipated, and internalized stigma independently, each of the higher levels of enacted stigma were associated with a significant increase in the prevalence of sharing any injection equipment (Model 1b Enacted Stigma; 2, aPR 1.4, CI 1.1-1.7; 3, aPR 1.6, CI 1.2-1.9; 3, aPR 1.4, CI 1.1-1.8). In the adjusted analysis which used the same categories for stigma, there was a significant increase in the prevalence of injecting with syringes used by others for those experiencing the highest level of enacted stigma compared to those with the lowest level of enacted stigma (Model 2b, aPR 1.8, CI 1.1-2.9). In the adjusted analysis which treated stigma from health care workers, stigma from family members, and internalized stigma independently, there was a significant increase in the prevalence of sharing any injection equipment for those who reported the second lowest level of stigma from health care workers compared to those reporting the lowest level of stigma from health care workers (Model 1c, aPR 1.2, CI 1.0-1.3). There was also a significant increase in the prevalence of sharing any injection equipment for those who reported the highest level of stigma from family members compared to those reporting the lowest level of stigma from family

members (Model 1c, aPR 1.3, CI 1.0-1.7). Using the same stigma categories, there was a significant increase in the prevalence of injecting with syringes used by others for those who reported the highest level of stigma from family members compared to those reporting the lowest level of stigma from family members (Model 2c, aPR 1.7, CI 1.0=2.9).

Discussion

Significant associations were observed between stigma and having shared syringes or having shared any type of injection equipment. The significance of these relationships was dependent on how stigma was factored into the analysis. Increased levels of enacted stigma consistently showed a significant association with an increased prevalence of sharing injection equipment. The relationship between the stigma experienced by PWID due to their substance use requires further attention and research. These findings present information which can lead to the development of initiatives that can increase the utilization and efficacy of interventions focused on improving the health of PWID. Studies have shown an association between an increased level of stigma and engagement in treatment services (Semple et al, 2005; Louma et al, 2007; Bozinoff et al, 2018). These findings highlight the need to ensure treatment programs are not further stigmatizing the very individuals they are trying to help recover from substance use disorders. Health care workers will be vital in reducing the stigma felt by PWID as they engage health care services and other programs focused on drug treatment.

Additional research is needed in order to fully understand the mechanism through which increased substance use stigma affects an individual's risk of sharing injection equipment. However, stigma can affect an individual's life in a multitude of ways. Internalized stigma may help in the understanding of what may drive individuals to engage in substance use treatment. Their experiences with health care workers may further influence how engaged PWID are when it comes to substance use treatment as well as other preventative measures that can be taken for health care. While focusing on how substance use stigma affects different opportunities and aspects of a PWID's life, attention and effort will still need to be focused on reducing the effects of the opioid epidemic. These effects

may work in concert to amplify the negative health outcomes that PWID face. Interventions focused on reducing the effects of substance use should also include efforts to reduce the stigma around substance use. Potential interventions include outreach to community leaders and businesses around syringe exchange programs. Organized community opposition has delayed the implementation of public health programs focused on those who use drugs (Tempalski et al, 2007). Therefore, engaging with stakeholders, those who support and oppose the formation of SSPs will be necessary in order to undo the negative effects of the opioid epidemic and the negative effects of generations of substance use stigma. This will hopefully lead to other initiatives focused on legalizing more protections for the rights of people who use illicit drugs.

Limitations

This study has several limitations. The findings are derived from a cross-sectional design which limits our ability to make causal interpretations. All data was obtained from self-reported surveys, so it is possible that social desirability bias and/or recall bias resulted in under-reporting of sharing syringes or other injection equipment. Interviewers were trained to build rapport with respondents through neutral and non-judgmental language to help minimize social desirability bias. Interviewers were also instructed on neutral probing to help respondents better recall experiences that happened in the past. Participants were recruited using respondent driven sampling. While this methodology is ideal for sampling hidden populations like PWID, individuals who are a part of isolated IDU networks may not have been reached. The data were also collected from respondents in the New Orleans Metropolitan Statistical Area. In addition to PWID who are a part of isolated IDU networks, accessibility to the study sites may have been reduced for individuals who lived further away from the study sites. The experiences and association between substance use stigma and injection behaviors may differ for individuals who reside in more rural parts of Louisiana who also have reduced assess to transportation.

Conclusion

In order to effectively work towards reducing substance use stigma, interventions and policies should account for the complex and sometimes competing priorities that they will be faced with. Stigma is a construct that is present at various ecological levels including structural, interpersonal, and intrapersonal. While substance use stigma at one level can reinforce the effects of stigma at other levels, interventions have the potential to also work in cohesion and strengthen other stigma reducing efforts at various levels. It is important that efforts focused on reducing substance use do not cause further harm by increasing the stigma experiences by PWUD. Efforts like the War on Drugs that focus on criminalization instead of improving health outcomes have further marginalized those with an addiction disorder. Other interventions such as public service announcements often rely on negative labeling to encourage abstinence. While there are commonalities between substance use stigma and mental illness stigma, it is important to continue to grow the amount of research that focuses specifically on substance use stigma. There are many differences between substance use and mental illness which can affect an individual's ability to achieve their life goals. One of the primary differences is differential treatment under the legal system which then effects other realms of society. Further research is required to better understand how substance use stigma affects individuals. This information can then be used to inform and shape future interventions and policies in order to more effectively reduce substance use stigma as a barrier for individuals to access healthcare services and achieve their lifegoals.

Chapter 3

Conclusion

Stigma, especially in the context of substance use, is an issue that warrants additional attention. It is important to continue to explore the relationship substance use stigma has with health seeking behaviors. To more fully understand these relationships, the approaches to substance use and

prevention efforts that contribute to increases in substance use stigma must be understood. Substance use is highly stigmatized in the U.S. and has been for generations. Public service announcements have often used stigmatized views of PWUD and the criminal justice consequences as a deterrent to substance use. This focus on the potential negative consequences of substance use can cause further stigmatization (Guttman & Salmon, 2004). Interventions with the aim of reducing substance use stigma can therefore be in opposition to the methods used in interventions focused on reducing substance use.

The stigmatizing views that have been reinforced through interventions aimed at curbing the use of drugs represent one of the ways substance use stigma exists and is intertwined in societal views. The effects of substance use stigma on PWUD are significant at multiple levels of the ecological model. Therefore, effective interventions at any specific level should reinforce efforts at other levels in a reciprocal manner. When this is not done, intervention efforts are hampered. One example is described by a study in Canada which shows a reduction in syringes handed out after police made an increased effort to be more visible around an SSP (Wood et al, 2003). Another study in California showed a significant increase in arrests for PWID who utilized legal syringe exchange programs compared to those who used illegal syringe exchange programs (Martinez et al, 2007). This example helps illustrate the need to focus on multiple levels when focusing on harm reduction. Efforts to reduce substance use stigma will need to take similar approaches. In addition to reaching out to law enforcement to get their buy-in, syringe exchange programs can also reach out to community leaders and local businesses in an attempt increase the familiarity that the general public has with PWID. Multilevel approaches like these will be necessary to begin to undo the multiple types of stigma that PWID face. In describing stigma reducing interventions across levels, Cook et. al identifies programs at the structural, interpersonal, and intrapersonal levels (Cook et al, 2014). While various types of stigma are discussed by Cook et. al, the ecological approach for stigma reduction is equally productive when it is applied solely to substance use stigma. Unlike various other stigmatized conditions, such as mental health, substance use also has criminal justice implications. In addition to potentially facing

criminal prosecution for substance use, it is legal for PWUD to face other consequences which include the loss of employment, housing, as well as differential treatment in healthcare. These effects at the structural level influence the way PWUD are treated by others as well how they feel about themselves.

Substance use stigma differs from most stigmatized conditions at the structural level. Many substances, especially those that can be injected, are illegal. This increases the risk that PWUD will enter the justice system. Being incarcerated and having a history of incarceration, in addition to substance use can limit the employment and housing opportunities for individuals. Although some industries have programs in place to work with those with a substance use disorder, having a positive drug test can be cause for termination. Although experiences of incarceration and poor health outcomes have been used during public service announcements as preventative deterrents for substance use, they also reinforce stigma associated with substance use. Efforts to decouple substance use from the negative legal outcomes may also help reduce the stigma associated with substance use. Interventions such as drug treatment courts have already proven to be beneficial by leading to reductions in recidivism compared to traditional approaches in the U.S. for substance use (Brown, 2011; Gottfredson & Exum, 2002). The shift from taking punitive measures to a public health approach allows a more holistic approach that can focus on the health and well-being of communities, including PWUD.

Another far-reaching intervention is the legalization and promotion of harm reduction programs like syringe service programs and safe injection sites. By legalizing these harm reduction programs, organizations can legally operate and thus more easily facilitate using sterile injection equipment. These organization also have the added benefit of creating environments that increase the accessibility and utilization of treatment programs and other health care services (Strathdee et al, 1999; Burr et al, 2014).

The legalization and proliferation of harm reduction programs is one method of increasing the knowledge of and familiarity of PWUD by the general public. The creation of programs to shift

cultural and community views regarding PWUD can also utilize increasing the public's familiarity with PWUD. Increases in familiarity has shown reductions in stigmatizing views and increases in positive attitudes towards PWUD (Janulis et al, 2013; Brener et al, 2007). Focusing attention on structural issues and barriers that are in place can continue to shift the focus from punitive measures to public health. Indirectly, these interventions can continue to facilitate reductions in substance use stigma by replacing the focus on incarceration for substance use to harm reduction including medication assisted treatment and other detox facilities.

Locations that provide services for PWUD are some of the primary locations where stigma reducing interventions at the interpersonal level can be facilitated. Although PWUD are a marginalized and hidden population, they often come into contact with health care workers and those who work at substance abuse centers.

Those employed at these organizations can be seen as facilitating increased utilization of vital health care services or a potential barrier. Considering the poorer health outcomes among people with substance use disorders, efforts to increase health care utilization should also focus on the interactions that staff have with PWUD. When PWUD believe they are being discriminated against, they are less likely to complete drug treatment programs and are discouraged from utilizing other needed services (Brener et al, 2010; Weiss et al, 2004). Assessing the attitudes and behaviors of health care workers regarding substance use can provide important information that can help decrease barriers to care for much needed health care services.

At the intrapersonal level, substance use stigma operates as internalized stigma. Prior research has shown poorer health outcomes associated with internalized stigma associated with substance use (Calabrese et al, 2016; Cama et al, 2016). Interventions to decrease internalized stigma can focus on empowerment as well as positive coping behaviors. The relationship between internalized stigma, goal-related behaviors, and several mediating processes have been explored in detail for mental illness (Corrigan et al, 2009, 2015). The term, "why try" has been used to reference the phenomenon that describes how these processes are tied together. Stereotypes affect both public stigma and internalized

stigma. These stereotypes can result in internalized stigma when individuals living with a mental illness are aware of them, agree with them, and apply the stereotypes to themselves. Self-esteem and self-efficacy can mediate the effect of internalized stigma on behaviors related to the pursuit of life goals. An intervention which focuses on empowerment by increasing self-esteem and self-efficacy may be able to offset some of the negative effects of internalized stigma.

In 2016 the National Academies of Sciences, Engineering, and Medicine released a report focused on ending discrimination against people with mental and substance use disorders (National Academies of Sciences, Engineering, and Medicine, 2016). The report provides a comprehensive overview of approaches and strategies to reduce stigma as well as various recommendations to facilitate the ending of discrimination. In concluding, the report states the following:

"The experiences of the U.S. campaigns related to HIV/AIDS and of anti-stigma campaigns in Australia, Canada, and England demonstrate the need for a coordinated and sustained effort over two or more decades to reduce the stigma associated with mental and substance use disorders" (National Academies of Sciences, Engineering, and Medicine, 2016, p 6).

Considering how efforts like the U.S. war on drugs have shaped and affected the way substance use those PWUD are treated and viewed at various ecological level, it becomes easier to understand the need for a multi-decade approach. When considering substance use stigma specifically, it is important to understand and consider how potential interventions and policies will affect the various ecological levels in a framework that considers other competing agendas.

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Tables and Figures

Figure 1
Model of directed acyclic graph showing confounding variables (Textor et al, 2017).

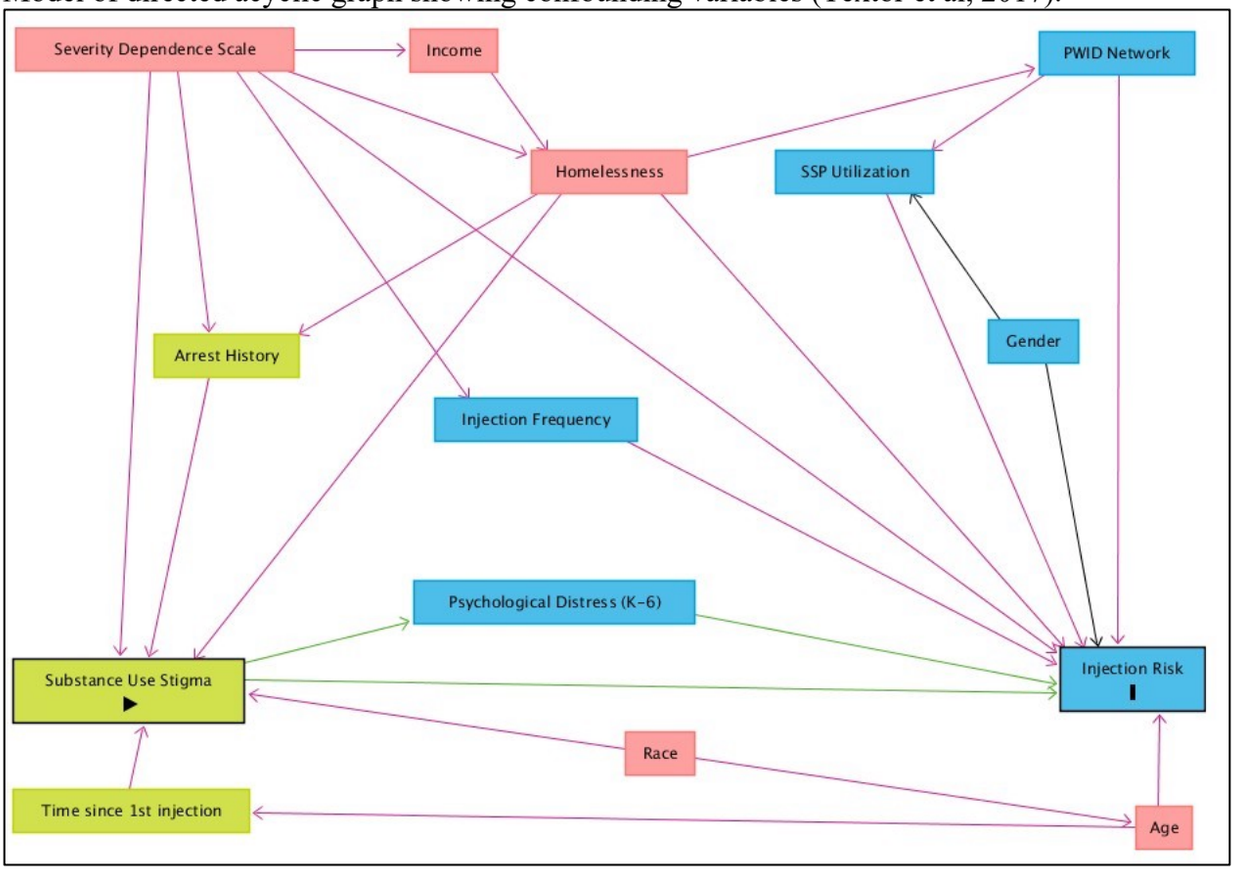

Table 1
Bivariate associations between equipment sharing behaviors and demographic characteristics among people who inject drugs in the New Orleans MSA.

	Total	**Received any used items**		**Received used syringes**	
	N (%)	**N (%)**	**Chi-Squared p-value**	**N (%)**	**Chi-Squared p-value**
Race	**418 (100)**	**335 (100)**	**0.0397**	**197 (100)**	**0.0100**
White	222 (53.1)	183 (54.6)		119 (60.4)	
Black	125 (29.9)	91 (27.2)		46 (23.4)	
Other	71 (17.0)	61 (18.2)		32 (16.2)	
Age	**418 (100)**	**335 (100)**	**0.4453**	**197 (100)**	**0.0128**
18 - 29	71 (17.0)	58 (17.3)		45 (22.8)	
30 - 39	160 (38.3)	131 (39.1)		75 (38.1)	
40 - 49	125 (29.9)	101 (30.2)		54 (27.4)	
50+	62 (14.8)	45 (13.4)		23 (11.7)	
Gender	**418 (100)**	**335 (100)**	**0.1348**	**197 (100)**	**0.0810**
Male	290 (69.4)	225 (67.2)		135 (68.5)	
Female	123 (29.4)	106 (31.6)		62 (31.5)	
Transgender	5 (1.2)	4 (1.2)		0 (0.0)	
Income	**415 (100)**	**332 (100)**	**0.2329**	**194 (100)**	**0.7609**
$0 - $14,999	284 (68.4)	221 (66.6)		130 (67.0)	
$15,000 - $39,999	98 (23.6)	84 (25.3)		49 (25.3)	
$40,000 +	33 (8.0)	27 (8.1)		15 (7.7)	
Network Size	**418 (100)**	**335 (100)**	**0.5292**	**197 (100)**	**0.1586**
0 - 5	29 (6.9)	20 (6.0)		16 (8.1)	
6-10	43 (10.3)	33 (9.9)		16 (8.1)	
11-25	124 (29.7)	102 (30.5)		60 (30.5)	
26 - 50	111 (26.6)	89 (26.6)		45 (22.8)	
> 50	111 (26.6)	91 (27.2)		60 (30.5)	
Homeless[a]	**418 (100)**	**335 (100)**	**0.8609**	**197 (100)**	**0.1389**
No	114 (27.3)	92 (27.5)		47 (23.9)	
Yes	304 (72.7)	243 (72.5)		150 (76.1)	
Arrest[a]	**417 (100)**	**334 (100)**	**0.1039**	**196 (100)**	**0.4529**
No	223 (53.5)	172 (51.5)		101 (51.5)	
Yes	194 (46.5)	162 (48.5)		95 (48.5)	
Education	**417 (100)**	**335 (100)**	**0.1222**	**197 (100)**	**0.6482**
Up to 11th Grade	133 (31.9)	101 (30.2)		65 (33.0)	
12th Grade or GED or more	284 (68.1)	234 (69.9)		132 (67.0)	
Currently insured	**417 (100)**	**334 (100)**	**0.8889**	**197 (100)**	**0.7038**
No	118 (28.3)	94 (28.1)		54 (27.4)	
Yes	299 (71.7)	240 (71.9)		143 (72.6)	
Accessed Syringe Service Program[a]	**418 (100)**	**335 (100)**	**0.7540**	**197 (100)**	**0.7610**
No	190 (45.5)	151 (45.1)		88 (44.7)	
Yes	228 (54.6)	184 (54.9)		109 (55.3)	

Time since 1st Injection	**418 (100)**	**335 (100)**	**0.3486**	**197 (100)**	**0.0391**
0 - 5 years	79 (18.9)	60 (17.9)		36 (18.3)	
6 - 10 years	79 (18.9)	66 (19.7)		48 (24.4)	
11 - 15 years	71 (17.0)	56 (16.7)		36 (18.3)	
16 - 20 years	62 (14.8)	54 (16.1)		29 (14.7)	
21 - 25 years	59 (14.1)	49 (14.6)		25 (12.7)	
> 25 years	68 (16.3)	50 (14.9)		23 (11.7)	
HCV Antibody Test	**413 (100)**	**330 (100)**	**0.0001**	**192 (100)**	**0.0118**
Negative	94 (22.8)	62 (18.8)		33 (17.2)	
Reactive[b]	319 (77.2)	268 (81.2)		159 (82.8)	
Reactive HCV Antibody Test	**319 (100)**	**268 (100)**	**0.7794**	**159 (100)**	**0.9344**
Known Reactive	218 (68.3)	184 (68.7)		109 (68.6)	
New Reactive	101 (31.7)	84 (31.3)		50 (31.5)	
HIV Test Result	**417 (100)**	**334 (100)**	**0.5350**	**196 (100)**	**0.1839**
Negative	406 (97.4)	326 (97.6)		193 (98.5)	
Positive[b]	11 (2.6)	8 (2.4)		3 (1.5)	

[a] Event occurred in the past 12 months

[b] Includes individuals aware and unaware of their status

Table 2
A multivariable analysis of unadjusted and adjusted prevalence ratios including select variables and substance use stigma (n=418).

	Received any used items		Received used syringes	
	PR (95% CI)	aPR (95% CI)	PR (95% CI)	aPR (95% CI)
	Model 1a		Model 2a	
Age (ref = 50+)				
18 - 29	1.1 (0.9-1.4)	1.1 (0.9-1.3)	1.7 (1.2-2.5)**	1.6 (1.1-2.4)**
30 - 39	1.1 (1.0-1.3)	1.1 (0.9-1.3)	1.3 (0.9-1.8)	1.2 (0.8-1.8)
40 - 49	1.1 (0.9-1.3)	1.1 (0.9-1.3)	1.2 (0.8-1.7)	1.2 (0.8-1.7)
Homeless	1.0 (0.9-1.1)	0.9 (0.8-1.0)	1.2 (0.9-1.5)	1.1 (0.9-1.4)
SDS	1.0 (1.0-1.0)**	1.0 (1.0-1.0)*	1.0 (1.0-1.1)**	1.0 (1.0-1.1)
Stigma (ref = 1)				
2	1.2 (0.9-1.5)	1.1 (0.8-1.5)	1.0 (0.6-1.6)	0.9 (0.6-1.5)
3	1.4 (1.1-1.8)*	1.3 (1.0-1.7)	1.4 (0.9-2.3)	1.3 (0.8-2.0)
4	1.4 (1.1-1.9)*	1.3 (1.0-1.7)	1.6 (1.0-2.6)	1.4 (0.8-2.3)
	Model 1b		Model 2b	
Age (ref = 50+)				
18 - 29	1.1 (0.9-1.4)	1.1 (0.9-1.3)	1.7 (1.2-2.5)**	1.7 (1.2-2.5)**
30 - 39	1.1 (1.0-1.3)	1.1 (0.9-1.3)	1.3 (0.9-1.8)	1.2 (0.8-1.8)
40 - 49	1.1 (0.9-1.3)	1.1 (0.9-1.3)	1.2 (0.8-1.7)	1.1 (0.8-1.7)
Homeless	1.0 (0.9-1.1)	0.9 (0.8-1.0)	1.2 (0.9-1.5)	1.1 (0.8-1.4)
SDS	1.0 (1.0-1.0)**	1.0 (1.0-1.0)*	1.0 (1.0-1.1)**	1.0 (1.0-1.1)
Stigma Factors (ref = 1)				
Enacted				
2	1.4 (1.1-1.7)**	1.3 (1.0-1.6)*	1.4 (0.9-2.0)	1.3 (0.8-1.9)
3	1.6 (1.2-1.9)**	1.5 (1.2-1.9)**	1.6 (1.0-2.4)*	1.5 (1.0-2.2)
4	1.4 (1.1-1.8)**	1.3 (1.0-1.7)*	1.9 (1.2-3.1)**	1.8 (1.1-2.9)*
Anticipated				
2	0.9 (0.8-1.2)	0.9 (0.8-1.2)	1.0 (0.6-1.4)	0.9 (0.6-1.4)
3	0.9 (0.7-1.1)	0.9 (0.7-1.1)	1.0 (0.7-1.5)	1.0 (0.7-1.5)
4	1.0 (0.8-1.2)	1.0 (0.8-1.2)	0.9 (0.6-1.5)	0.9 (0.5-1.4)
Internalized				
2	0.9 (0.8-1.1)	0.9 (0.7-1.1)	0.8 (0.5-1.1)	0.8 (0.5-1.1)
3	0.9 (0.8-1.1)	0.9 (0.8-1.1)	1.1 (0.8-1.5)	1.1 (0.8-1.5)
4	1.1 (0.9-1.2)	1.0 (0.8-1.1)	1.0 (0.7-1.4)	0.9 (0.6-1.3)
	Model 1c		Model 2c	
Age (ref = 50+)				
18 - 29	1.1 (0.9-1.4)	1.1 (0.9-1.3)	1.7 (1.2-2.5)**	1.7 (1.1-2.4)**
30 - 39	1.1 (1.0-1.3)	1.1 (0.9-1.3)	1.3 (0.9-1.8)	1.3 (0.9-1.8)
40 - 49	1.1 (0.9-1.3)	1.1 (0.9-1.3)	1.2 (0.8-1.7)	1.2 (0.8-1.7)
Homeless	1.0 (0.9-1.1)	0.9 (0.8-1.0)	1.2 (0.9-1.5)	1.1 (0.8-1.4)
SDS	1.0 (1.0-1.0)**	1.0 (1.0-1.0)*	1.0 (1.0-1.1)**	1.0 (1.0-1.1)
Stigma Factors (ref = 1)				
Health Care Workers				
2	1.2 (1.0-1.3)*	1.2 (1.0-1.3)*	1.2 (1.0-1.6)	1.2 (1.0-1.6)
3	1.1 (0.9-1.2)	1.1 (0.9-1.2)	1.0 (0.7-1.4)	1.0 (0.7-1.3)
4	1.1 (1.0-1.3)	1.1 (1.0-1.3)	1.3 (1.0-1.7)	1.2 (0.9-1.7)

Family				
2	1.2 (0.9-1.6)	1.2 (0.9-1.6)	1.7 (1.0-2.9)	1.6 (0.9-2.8)
3	1.3 (1.0-1.7)*	1.3 (1.0-1.7)	1.7 (1.0-2.8)	1.5 (0.9-2.6)
4	1.4 (1.0-1.8)*	1.3 (1.0-1.7)*	1.9 (1.1-3.3)**	1.7 (1.0-2.9)*
Internalized				
2	0.9 (0.8-1.1)	0.9 (0.8-1.1)	0.7 (0.5-1.1)	0.8 (0.5-1.1)
3	1.0 (0.8-1.1)	0.9 (0.8-1.1)	1.1 (0.8-1.5)	1.1 (0.8-1.5)
4	1.1 (0.9-1.3)	1.0 (0.8-1.2)	1.0 (0.7-1.4)	0.9 (0.6-1.4)

Abbreviations: PR: Prevalence Ratio; aPR: Adjusted Prevalence Ratio; SDS: Severity Dependence Scale. Prevalence ratios for each model include all substance use stigma factors.

* $p < 0.05$

** $p < 0.01$

Appendix A: Survey Questions

Table A1

Survey questions used to categorize sharing behavior for having received a syringe and having received any items for injecting drugs.

Question	Response Options
In the past 12 months when you injected, how often did you use a new, sterile needle? By a new, sterile needle, I mean a needle never used before by anyone, even you.	0 Never 1 Rarely 2 About half the time 3 Most of the time 4 Always
In the past 12 months, with how many different people did you use a needle after they injected with it?	Range: 0 - 300
In the past 12 months, with how many different people did you use the same cooker, cotton, or water that they had already used? By "water", I mean water for rinsing needles or preparing drugs.	Range: 0 - 300
In the past 12 months, with how many different people did you use drugs that had been divided with a syringe that they had already used?	Range: 0 - 300

Table A2

Survey questions assessing substance use stigma (Smith et. al, 2016).

Enacted Stigma Prompt: How often have people treated you this way **in the past** because of your drug use history?	
Enacted Stigma Questions:	**Response Options:**
Family members have thought that I cannot be trusted.	1 = Never 2 = Not often 3 = Somewhat often 4 = Often 5 = Very Often
Family members have looked down on me.	
Family members have treated me differently.	
Healthcare workers have not listened to my concerns.	
Healthcare workers have though that I'm pill shopping, or trying to con them into giving me prescription medications to get high or sell.	
Healthcare workers have given me poor care.	
Anticipated Stigma Prompt: How likely is it that people will treat you in the following ways **in the future** because of your drug use history?	
Anticipated Stigma Questions:	**Response Options:**
Family members will think that I cannot be trusted.	1 = Very unlikely 2 = Unlikely 3 = Neither unlikely nor likely 4 = Likely 5 = Very likely
Family members will look down on me.	
Family members will treat me differently.	
Healthcare workers will not listen to my concerns.	
Healthcare workers will think that I'm pill shopping, or trying to con them into giving me prescription medications to get high or sell.	
Healthcare workers will give me poor care.	
Internalized Stigma Prompt: How do you **feel** about your drug use history?	
Internalized Stigma Questions:	**Response Options:**
Having used drugs makes me feel like I'm a bad person.	1 = Strongly disagree 2 = Disagree 3 = Neither disagree nor agree 4 = Agree 5 = Strongly agree
I feel I'm not as good as others because I used drugs.	
I feel ashamed of having used drugs.	
I think less of myself because I used drugs.	
Having used drugs makes me feel unclean.	
Having used drugs is disgusting to me.	

Appendix 2: SAS Code

```
options nofmterr;
data IDU5_0wc; *570 completed core interviews;
      set '/folders/myfolders/IDU Trends
Core/Thesis/idu5_v112619.sas7bdat';
      where complete = 1;

      if YR_INJ = . then INJ_HIST = .;
      else if YR_INJ in (0:5) then INJ_HIST = 1;
      else if YR_INJ in (6:10) then INJ_HIST = 2;
      else if YR_INJ in (11:15) then INJ_HIST = 3;
      else if YR_INJ in (16:20) then INJ_HIST = 4;
      else if YR_INJ in (21:25) then INJ_HIST = 5;
      else if YR_INJ > 25 then INJ_HIST = 6;

      if EVHELD = . then ARREST = .;
      else if EVHELD = 0 then ARREST = 0;
      else if HELD12M = 0 then ARREST = 0;
      else if HELD12M = 1 then ARREST = 1;

*shared any type of equipment;
rec_score = 0;
array r_array {2} rec_ccw rec_dda;
do i = 1 to 2;
      if r_array {i} = . then rec_score = .;
      if r_array {i} = 0 then rec_score = rec_score + 0;
      if r_array {i} = 1 then rec_score = rec_score + 1;
end;

if rec_score = . then rec_ccwd = .;
if rec_score = 0 then rec_ccwd = 0;
if rec_score >= 1 then rec_ccwd = 1;

      if HHINCOM = . then INCOME = .;
      else if HHINCOM in (0:3) then INCOME = 1;
      else if HHINCOM in (4:8) then INCOME = 2;
      else if HHINCOM in (9:12) then INCOME = 3;

if HD_HCRAPRSLT in (0,1) then do;
      if HD_HCRAPRSLT = 0 then HCV = 0;
      else if HD_HCRAPRSLT = 1 and HEPCEVER = 1 then HCV = 1;
      else if HD_HCRAPRSLT = 1 then HCV = 2;
end;

run;
data IDU5_wc;*n is the same for 'most' tables n=418;
      set IDU5_0wc;
```

```
      where m_sus ne . and rec_any ne . and rec_sy ne .
      and rec_ccwd ne . and sev ne . and evrhomls in (0,1);
run;

**** Start Macros ****;
%macro freq(V);
proc freq data=IDU5_wc;
      table &V;
run;
%mend;

%macro mean(V);
proc means data=IDU5_wc;
      class &V;
      var age;
run;
%mend;

%macro cronbach(var=);
proc corr data=IDU5_wc alpha nomiss;
      var &var;
run;
%mend;

%macro histogram(var);
proc univariate data=IDU5_wc;
      var &var;
      histogram &var/normal;
      probplot &var/normal (mu=est sigma=est) square;
run;
%mend;

%macro trend(rec,var);
proc freq data=IDU5_wc;
      table &REC*&VAR/trend measures cl norow nopercent;
      test smdrc;
      exact trend;
run;
%mend;

**** Results Sample Description  ****;

proc freq data=IDU5_wc;
      table E_USINJ SPECE_ID DRUGTX DGTXTRY DRUGTX*DGTXTRY VSITMD12;
run;
%freq(V=STERILE*REC_CCWD);
proc means data=IDU5_wc;
      var age YR_INJ;
run;
```

```
*Table 1;
proc freq data=IDU5_wc;
     table (RACE_C3 C4_AGE GENDER INCOME NS_C5 EVRHOMLS ARREST
     EDU CURRHLTH SE_RNDL INJ_HIST TD_HIVRSLT
     REC_SY REC_CCWD REC_ANY);
run;
proc freq data=IDU5_wc;
     where HD_HCRAPRSLT in (0,1);
     table HD_HCRAPRSLT;
run;
%freq(dope INJD_HE INJD_SB INJD_PC INJD_CC INJD_ME INJD_RX);

******;
proc freq data=IDU5_wc;
     table (RACE_C3 C4_AGE GENDER INCOME NS_C5 EVRHOMLS ARREST
     EDU CURRHLTH SE_RNDL INJ_HIST TD_HIVRSLT)*REC_ccwd
     /norow nopercent chisq;
run;
proc freq data=IDU5_wc;
     where HD_HCRAPRSLT in (0,1);
     table HD_HCRAPRSLT*REC_ccwd/norow nopercent chisq;
run;
proc freq data=IDU5_wc;
     where HCV in (1,2);
     table HCV*REC_ANY/chisq nocol norow nopercent;
run;

proc freq data=IDU5_wc;
     table (RACE_C3 C4_AGE GENDER INCOME NS_C5 EVRHOMLS ARREST
     EDU CURRHLTH SE_RNDL INJ_HIST TD_HIVRSLT)*REC_SY
     /nocol norow nopercent;
run;
proc freq data=IDU5_wc;
     where HD_HCRAPRSLT in (0,1);
     table HD_HCRAPRSLT*REC_SY/nocol norow nopercent;
run;
proc freq data=IDU5_wc;
     where HCV in (1,2);
     table HCV*REC_SY/chisq nocol norow nopercent;
run;

proc freq data=IDU5_wc;
     where HCV in (1,2);
     table HCV;
run;

proc freq data=IDU5_wc;
```

```
      table (RACE_C3 C4_AGE GENDER INCOME NS_C5 EVRHOMLS ARREST
      EDU CURRHLTH SE_RNDL INJ_HIST TD_HIVRSLT)*REC_ANY
      /nofreq norow nopercent;
run;
proc freq data=IDU5_wc;
      where HD_HCRAPRSLT in (0,1);
      table HD_HCRAPRSLT*REC_ANY/nofreq norow nopercent;
run;
proc freq data=IDU5_wc;
      where HCV in (1,2);
      table HCV*REC_ANY/nofreq norow nopercent;
run;

proc freq data=IDU5_wc;
      table (RACE_C3 C4_AGE GENDER INCOME NS_C5 EVRHOMLS ARREST
      EDU CURRHLTH SE_RNDL INJ_HIST TD_HIVRSLT)*REC_SY
      /nofreq norow nopercent;
run;
proc freq data=IDU5_wc;
      where HD_HCRAPRSLT in (0,1);
      table HD_HCRAPRSLT*REC_SY/nofreq norow nopercent;
run;
proc freq data=IDU5_wc;
      where HCV in (1,2);
      table HCV*REC_SY/nofreq norow nopercent;
run;
****;
proc freq data=IDU5_wc;
      table (RACE_C3 C4_AGE GENDER INCOME NS_C5 EVRHOMLS ARREST
      EDU CURRHLTH SE_RNDL INJ_HIST TD_HIVRSLT)*REC_CCWD
      /nocol nopercent chisq;
run;
proc freq data=IDU5_wc;
      where HD_HCRAPRSLT in (0,1);
      table HD_HCRAPRSLT*REC_CCWD/nofreq nocol nopercent chisq;
run;
proc freq data=IDU5_wc;
      table HCV*REC_CCWD/nofreq nocol nopercent chisq;
run;



proc freq data=IDU5_wc;
      where TD_HIVRSLT in (0:1);
      table EVERPOS TD_HIVRSLT EVERPOS*TD_HIVRSLT;
run;
proc freq data=IDU5_wc;
      where HD_HCRAPRSLT in (0:1);
      table HEPCEVER HD_HCRAPRSLT HEPCEVER*HD_HCRAPRSLT;
```

```
run;

proc freq data=IDU5_wc;
      table rec_ccwd rec_ccw*rec_dda;
run;

proc freq data=IDU5_wc;
      table HHINCOM EVRHOMLS EVHELD GENDER RACE_CAT RACE_C3 C4_AGE
SE_RNDL REC_ANY REC_SY REC_CCW;
run;

proc freq data=IDU5_wc;
      where sev ne .;
      table STERILE NUM_NA NUM_CCW NUM_DDA SHARNDLE SHARWORK SAMESYR;
run;

proc freq data=IDU5_wc;
      where sev ne .;
      table M_SUS_E M_SUS_A M_SUS_I M_SUS;
run;

proc freq data=IDU5_wc;
      table SEV;
run;




********** poisson **********;

*#1a;
%macro poi(O=,V=);
proc genmod data=IDU5_wc descending;
      class surid c4_age (ref='4') /param=ref;
      model &O=&V /dist=poisson link=log;
      repeated subject = surid/type=ind;
      estimate 'PR' &V 1;
run;
%mend;




*#1b;
%macro poi(O=,V=);
proc genmod data=IDU5_wc descending;
      class surid c4_age (ref='4') /param=ref;
      model &O=&V /dist=poisson link=log;
      repeated subject = surid/type=ind;
```

```
      estimate '18-29' c4_age 1 0 0;
      estimate '30-39' c4_age 0 1 0;
      estimate '40-49' c4_age 0 0 1;
run;
%mend;

*#2a;
%macro poi(O=,E=,V=);
proc genmod data=IDU5_wc;
      class surid c4_age (ref='4') &E (ref='1') /param=ref;
      model &O=&E &V /dist=poisson link=log;
      repeated subject = surid/type=ind;
      estimate '2v1' &E 1 0 0;
      estimate '3v1' &E 0 1 0;
      estimate '4v1' &E 0 0 1;
run;
%mend;



*#2b;
%macro poi(O=,E=,V=);
proc genmod data=IDU5_wc;
      class surid c4_age (ref='4') &E (ref='1') /param=ref;
      model &O=&E &V /dist=poisson link=log;
      repeated subject = surid/type=ind;
      estimate '18-29' c4_age 1 0 0;
      estimate '30-39' c4_age 0 1 0;
      estimate '40-49' c4_age 0 0 1;
      estimate 'HMLS12M' EVRHOMLS 1;
      estimate 'SEV' sev 1;
      estimate '2v1' &E 1 0 0;
      estimate '3v1' &E 0 1 0;
      estimate '4v1' &E 0 0 1;
run;
%mend;

*#3a;
%macro poi(O=,E=,E2=,E3=);
proc genmod data=IDU5_wc descending;
      class surid &E (ref='1') &E2 (ref='1') &E3 (ref='1') c4_age
(ref='4') /param=ref;
      model &O=&E &E2 &E3/dist=poisson link=log;
      repeated subject = surid/type=ind;
      estimate '2v1a' &E 1 0 0;
      estimate '3v1a' &E 0 1 0;
      estimate '4v1a' &E 0 0 1;
      estimate '2v1b' &E2 1 0 0;
      estimate '3v1b' &E2 0 1 0;
```

```
      estimate '4v1b' &E2 0 0 1;
      estimate '2v1c' &E3 1 0 0;
      estimate '3v1c' &E3 0 1 0;
      estimate '4v1c' &E3 0 0 1;
run;
%mend;

*#3b;
%macro poi(O=,E=,E2=,E3=,V=);
proc genmod data=IDU5_wc descending;
      class surid &E (ref='1') &E2 (ref='1') &E3 (ref='1') c4_age
(ref='4') /param=ref;
      model &O=&E &E2 &E3 &V /dist=poisson link=log;
      repeated subject = surid/type=ind;
      estimate '18-29' c4_age 1 0 0;
      estimate '30-39' c4_age 0 1 0;
      estimate '40-49' c4_age 0 0 1;
      estimate 'HMLS12M' EVRHOMLS 1;
      estimate 'SEV' sev 1;
      estimate '2v1a' &E 1 0 0;
      estimate '3v1a' &E 0 1 0;
      estimate '4v1a' &E 0 0 1;
      estimate '2v1b' &E2 1 0 0;
      estimate '3v1b' &E2 0 1 0;
      estimate '4v1b' &E2 0 0 1;
      estimate '2v1c' &E3 1 0 0;
      estimate '3v1c' &E3 0 1 0;
      estimate '4v1c' &E3 0 0 1;
run;
%mend;

*#3c;
%macro poi(O=,E1=,E2=,E3=,E4=,E5=);
proc genmod data=IDU5_wc descending;
      class surid &E1 (ref='1') &E2 (ref='1') &E3 (ref='1') &E4
(ref='1') &E5 (ref='1')/param=ref;
      model &O=&E1 &E2 &E3 &E4 &E5/dist=poisson link=log;
      repeated subject = surid/type=ind;
      estimate '2v1a' &E1 1 0 0;
      estimate '3v1a' &E1 0 1 0;
      estimate '4v1a' &E1 0 0 1;
      estimate '2v1b' &E2 1 0 0;
      estimate '3v1b' &E2 0 1 0;
      estimate '4v1b' &E2 0 0 1;
      estimate '2v1c' &E3 1 0 0;
      estimate '3v1c' &E3 0 1 0;
      estimate '4v1c' &E3 0 0 1;
      estimate '2v1b' &E4 1 0 0;
      estimate '3v1b' &E4 0 1 0;
```

```
      estimate '4v1b' &E4 0 0 1;
      estimate '2v1c' &E5 1 0 0;
      estimate '3v1c' &E5 0 1 0;
      estimate '4v1c' &E5 0 0 1;
run;
%mend;

*#3d;
%macro poi(O=,E1=,E2=,E3=,E4=,E5=,V=);
proc genmod data=IDU5_wc descending;
      class surid &E1 (ref='1') &E2 (ref='1') &E3 (ref='1') &E4
(ref='1') &E5 (ref='1') c4_age (ref='4') /param=ref;
      model &O=&E1 &E2 &E3 &E4 &E5 &V /dist=poisson link=log;
      repeated subject = surid/type=ind;
      estimate '18-29' c4_age 1 0 0;
      estimate '30-39' c4_age 0 1 0;
      estimate '40-49' c4_age 0 0 1;
      estimate 'HMLS12M' EVRHOMLS 1;
      estimate 'SEV' sev 1;
      estimate '2v1a' &E1 1 0 0;
      estimate '3v1a' &E1 0 1 0;
      estimate '4v1a' &E1 0 0 1;
      estimate '2v1b' &E2 1 0 0;
      estimate '3v1b' &E2 0 1 0;
      estimate '4v1b' &E2 0 0 1;
      estimate '2v1c' &E3 1 0 0;
      estimate '3v1c' &E3 0 1 0;
      estimate '4v1c' &E3 0 0 1;
      estimate '2v1b' &E4 1 0 0;
      estimate '3v1b' &E4 0 1 0;
      estimate '4v1b' &E4 0 0 1;
      estimate '2v1c' &E5 1 0 0;
      estimate '3v1c' &E5 0 1 0;
      estimate '4v1c' &E5 0 0 1;
run;
%mend;


*/

*************** End Macros ***************;

* prevalence ratio - poisson ;

*#1a;
%poi(O=rec_any,V=EVRHOMLS);
%poi(O=rec_any,V=sev);
%poi(O=rec_sy,V=EVRHOMLS);
%poi(O=rec_sy,V=sev);
```

```
%poi(O=rec_ccwd,V=EVRHOMLS);
%poi(O=rec_ccwd,V=sev);
%poi(O=rec_ccw,V=EVRHOMLS);
%poi(O=rec_ccw,V=sev);
%poi(O=rec_dda,V=EVRHOMLS);
%poi(O=rec_dda,V=sev);

*#1b;
%poi(O=rec_any,V=c4_age);
%poi(O=rec_sy,V=c4_age);
%poi(O=rec_ccwd,V=c4_age);
%poi(O=rec_ccw,V=c4_age);
%poi(O=rec_dda,V=c4_age);


*#2a;
%poi(O=rec_any,E=m_sus);
%poi(O=rec_sy,E=m_sus);
%poi(O=rec_ccwd,E=m_sus);
%poi(O=rec_ccw,E=m_sus);
%poi(O=rec_dda,E=m_sus);

%poi(O=rec_any,E=m_sus_e);
%poi(O=rec_sy,E=m_sus_e);
%poi(O=rec_ccwd,E=m_sus_e);
%poi(O=rec_ccw,E=m_sus_e);
%poi(O=rec_dda,E=m_sus_e);

%poi(O=rec_any,E=m_sus_a);
%poi(O=rec_sy,E=m_sus_a);
%poi(O=rec_ccwd,E=m_sus_a);
%poi(O=rec_ccw,E=m_sus_a);
%poi(O=rec_dda,E=m_sus_a);

%poi(O=rec_any,E=m_sus_i);
%poi(O=rec_sy,E=m_sus_i);
%poi(O=rec_ccwd,E=m_sus_i);
%poi(O=rec_ccw,E=m_sus_i);
%poi(O=rec_dda,E=m_sus_i);

%poi(O=rec_any,E=m_sus_hcw);
%poi(O=rec_sy,E=m_sus_hcw);
%poi(O=rec_ccwd,E=m_sus_hcw);
%poi(O=rec_ccw,E=m_sus_hcw);
%poi(O=rec_dda,E=m_sus_hcw);

%poi(O=rec_any,E=m_sus_fam);
%poi(O=rec_sy,E=m_sus_fam);
%poi(O=rec_ccwd,E=m_sus_fam);
```

```
%poi(O=rec_ccw,E=m_sus_fam);
%poi(O=rec_dda,E=m_sus_fam);

*#2b;
%poi(O=rec_any,E=m_sus,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E=m_sus,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccwd,E=m_sus,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccw,E=m_sus,V=c4_age EVRHOMLS sev);
%poi(O=rec_dda,E=m_sus,V=c4_age EVRHOMLS sev);

%poi(O=rec_any,E=m_sus_e,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E=m_sus_e,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccwd,E=m_sus_e,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccw,E=m_sus_e,V=c4_age EVRHOMLS sev);
%poi(O=rec_dda,E=m_sus_e,V=c4_age EVRHOMLS sev);

%poi(O=rec_any,E=m_sus_a,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E=m_sus_a,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccwd,E=m_sus_a,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccw,E=m_sus_a,V=c4_age EVRHOMLS sev);
%poi(O=rec_dda,E=m_sus_a,V=c4_age EVRHOMLS sev);

%poi(O=rec_any,E=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccwd,E=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccw,E=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_dda,E=m_sus_i,V=c4_age EVRHOMLS sev);

%poi(O=rec_any,E=m_sus_hcw,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E=m_sus_hcw,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccwd,E=m_sus_hcw,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccw,E=m_sus_hcw,V=c4_age EVRHOMLS sev);
%poi(O=rec_dda,E=m_sus_hcw,V=c4_age EVRHOMLS sev);

%poi(O=rec_any,E=m_sus_fam,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E=m_sus_fam,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccwd,E=m_sus_fam,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccw,E=m_sus_fam,V=c4_age EVRHOMLS sev);
%poi(O=rec_dda,E=m_sus_fam,V=c4_age EVRHOMLS sev);

*#3a;
%poi(O=rec_any,E=m_sus_e,E2=m_sus_a,E3=m_sus_i);
%poi(O=rec_sy,E=m_sus_e,E2=m_sus_a,E3=m_sus_i);
%poi(O=rec_ccwd,E=m_sus_e,E2=m_sus_a,E3=m_sus_i);
%poi(O=rec_ccw,E=m_sus_e,E2=m_sus_a,E3=m_sus_i);
%poi(O=rec_dda,E=m_sus_e,E2=m_sus_a,E3=m_sus_i);

%poi(O=rec_any,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i);
%poi(O=rec_sy,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i);
```

```
%poi(O=rec_ccwd,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i);
%poi(O=rec_ccw,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i);
%poi(O=rec_dda,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i);

*#3b;
%poi(O=rec_any,E=m_sus_e,E2=m_sus_a,E3=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E=m_sus_e,E2=m_sus_a,E3=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccwd,E=m_sus_e,E2=m_sus_a,E3=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_ccw,E=m_sus_e,E2=m_sus_a,E3=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_dda,E=m_sus_e,E2=m_sus_a,E3=m_sus_i,V=c4_age EVRHOMLS sev);

%poi(O=rec_any,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i,V=c4_age EVRHOMLS
sev);
%poi(O=rec_sy,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i,V=c4_age EVRHOMLS
sev);
%poi(O=rec_ccwd,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i,V=c4_age EVRHOMLS
sev);
%poi(O=rec_ccw,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i,V=c4_age EVRHOMLS
sev);
%poi(O=rec_dda,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i,V=c4_age EVRHOMLS
sev);


*#3b2;
%poi(O=rec_any,E=m_sus_e,E2=m_sus_a,E3=m_sus_i,V=c4_age EVRHOMLS sev
race_c3);
%poi(O=rec_sy,E=m_sus_e,E2=m_sus_a,E3=m_sus_i,V=c4_age EVRHOMLS sev
race_c3);

%poi(O=rec_any,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i,V=c4_age EVRHOMLS
sev race_c3);
%poi(O=rec_sy,E=m_sus_hcw,E2=m_sus_fam,E3=m_sus_i,V=c4_age EVRHOMLS sev
race_c3);

*#3c;
%poi(O=rec_any,E1=m_sus_ehcw,E2=m_sus_efam,E3=m_sus_ahcw,E4=m_sus_afam,
E5=m_sus_i);
%poi(O=rec_sy,E1=m_sus_ehcw,E2=m_sus_efam,E3=m_sus_ahcw,E4=m_sus_afam,E
5=m_sus_i);
*#3d;
%poi(O=rec_any,E1=m_sus_ehcw,E2=m_sus_efam,E3=m_sus_ahcw,E4=m_sus_afam,
E5=m_sus_i,V=c4_age EVRHOMLS sev);
%poi(O=rec_sy,E1=m_sus_ehcw,E2=m_sus_efam,E3=m_sus_ahcw,E4=m_sus_afam,E
5=m_sus_i,V=c4_age EVRHOMLS sev);
*Histograms;

%histogram(sev);
%histogram(c_sus);
%histogram(c_sus_e);
```

```
%histogram(c_sus_a);
%histogram(c_sus_i);
%histogram(c_sus_hcw);
%histogram(c_sus_fam);
%histogram(hhincom);


%mean(age_cat);
%mean(age_c4);
%freq(age_cat);
%freq(age_c4);

%freq(m_sus);
%freq(m_sus_e);
%freq(m_sus_a);
%freq(m_sus_i);
%freq(m_sus_hcw);
%freq(m_sus_fam);

*dummy vs continuous;
%trend(rec_any,m_sus);
%trend(rec_any,m_sus_e);
%trend(rec_any,m_sus_a);
%trend(rec_any,m_sus_i);
%trend(rec_any,m_sus_hcw);
%trend(rec_any,m_sus_fam);

%trend(rec_sy,m_sus);
%trend(rec_sy,m_sus_e);
%trend(rec_sy,m_sus_a);
%trend(rec_sy,m_sus_i);
%trend(rec_sy,m_sus_hcw);
%trend(rec_sy,m_sus_fam);

%trend(rec_ccw,m_sus);
%trend(rec_ccw,m_sus_e);
%trend(rec_ccw,m_sus_a);
%trend(rec_ccw,m_sus_i);
%trend(rec_ccw,m_sus_hcw);
%trend(rec_ccw,m_sus_fam);

%cronbach(var=SEV1 SEV2 SEV3 SEV4 SEV5);
%cronbach(var=SU_E1 SU_E2 SU_E3 SU_E4 SU_E5 SU_E6
          SU_A1 SU_A2 SU_A3 SU_A4 SU_A5 SU_A6
          SU_I1 SU_I2 SU_I3 SU_I4 SU_I5 SU_I6);
%cronbach(var=SU_E1 SU_E2 SU_E3 SU_E4 SU_E5 SU_E6);
%cronbach(var=SU_A1 SU_A2 SU_A3 SU_A4 SU_A5 SU_A6);
%cronbach(var=SU_I1 SU_I2 SU_I3 SU_I4 SU_I5 SU_I6);
%cronbach(var=SU_E1 SU_E2 SU_E3 SU_A1 SU_A2 SU_A3);
```

```
%cronbach(var=SU_E4 SU_E5 SU_E6 SU_A4 SU_A5 SU_A6);
```